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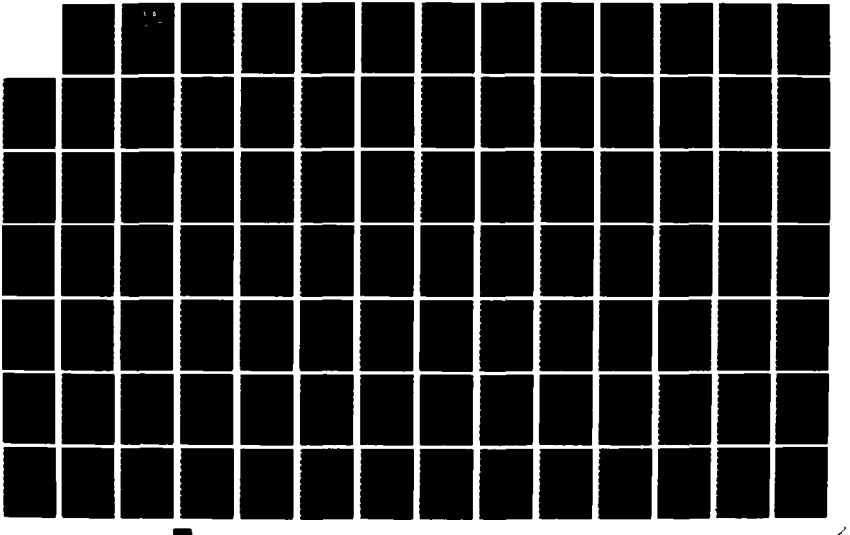

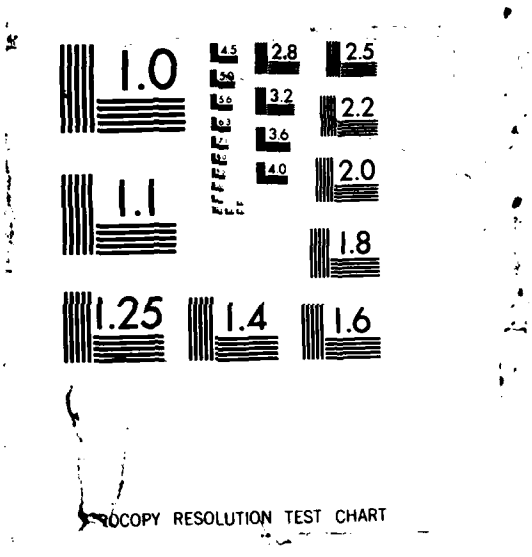
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CRC Report No. 548

1985 CRC OCTANE NUMBER REQUIREMENT SURVEY

October 1986

COORDINATING RESEARCH COUNCIL, INC.
219 PERIMETER CENTER PARKWAY, ATLANTA, GEORGIA 30346

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1985 CRC OCTANE NUMBER REQUIREMENT SURVEY

(CRC PROJECT No. CM-123-85)

Prepared by the

1985 Analysis Panel

of the

CRC Octane Number Requirement Survey Group

October 1986

Automotive Vehicle Fuel, Lubricant, and Equipment Research Committee

of the

Coordinating Research Council, Inc.

ABSTRACT

In the thirty-ninth annual statistical survey of current model vehicles conducted by the Coordinating Research Council, Inc., test data were obtained on 374 1985 model vehicles, including 309 US vehicles and 65 imported vehicles. Fifteen laboratories participated in this Survey. Maximum octane number requirements were determined by testing under part-throttle conditions, as well as at maximum-throttle. Requirements are expressed as the (R+M)/2 octane number, Research octane number, and Motor octane number of the reference fuel producing knock which was recurrent and repeatable at the lowest audible level. The primary analyses used in this report are based upon (R+M)/2 octane number requirements, rather than upon Research octane number requirements as in previous reports. Estimated octane number requirements for the US vehicles are weighted in proportion to the 1985 vehicle model production figures and, for the imported models, in proportion to import sales volume in the United States.

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Per Ms. Shirley Bradicich, CRC Inc.

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I. INTRODUCTION

In the thirty-ninth annual statistical survey of current model vehicles conducted by the Coordinating Research Council, Inc., test data were obtained on 374 1985 model-year vehicles, including 103 knock sensor-equipped vehicles and 9 select models of special interest. Three of the select models were equipped with knock sensors.

Passenger cars and light-duty trucks including vans were tested to represent the 1985 vehicle population in the United States. This year's Survey includes analyses for the following vehicle categories:

(1) US and Imported Vehicles -- 374 vehicles

(2) US and Imported Cars -- 342 cars

(3) US Vehicles -- 309 venicles

(4) US Cars -- 282 cars

(5) Imported Vehicles -- 65 vehicles

(6) Knock-Sensor Vehicles -- 103 vehicles

It should be noted that the term "cars" designates passenger cars only, while the term "vehicles" includes passenger cars plus vans and light-duty trucks.

Fifteen laboratories participated in this Survey; they are listed in Appendix A. Members of the CRC Octane Number Requirement Survey Analysis Panel are identified in Appendix B.

II. SUMMARY

Data were collected on 374 1985 model-year vehicles. These vehicles consisted of 309 US vehicles and 65 imported vehicles. There were 282 US and 60 imported passenger cars. The remainder consisted of twenty-seven US and five imported light-duty trucks and vans. The 1985 Survey included sufficient data for nine specific models which were analyzed separately as select models. All select models had automatic transmissions. The average deposit mileage in this Survey was 12,343. The weighted average engine displacement and compression ratio were 3.16 liters and 8.81, respectively. One hundred and three vehicles were equipped with knock sensors.

Requirements are expressed as the (R+M)/2 octane number, Research octane number (RON), and Motor octane number (MON) of the reference fuel which produced knock that was recurrent and repeatable at the lowest audible level. (This definition of borderline knock was used for the first time in the 1984 Survey.) Estimated octane number requirements for the US cars and light-duty trucks and vans are weighted in proportion to the 1985 vehicle model production figures and, for the imported models, in proportion to import sales volume in the United States.

It should be noted that the primary analyses used in this report are based upon (R+M)/2 octane number requirements, rather than upon RON requirements as in previous reports.

Part-throttle requirements were defined when their requirements were higher than the maximum-throttle requirements or, with FBRU fuels only, when they were within four octane numbers of maximum-throttle requirements. The maximum requirements listed for the 1985 Survey were reported by the same method used in prior Surveys. The greater of the maximum-throttle or part-throttle requirement is used, except when both the maximum-throttle and part-throttle requirements are the same. In that case, the maximum-throttle requirement is used. Maximum (high-borderline) and minimum (low-borderline) octane number requirements were reported for the knock sensor-equipped vehicles when determined.

This is the third Survey in which requirements for knock sensor-equipped vehicles were included in the distribution. The base analysis case for this report uses the maximum (high-borderline) octane number requirements of these vehicles. The following table for FBRU fuels presents maximum 1985 octane number requirements and changes from 1984 for the six weighted populations, at the 50 percent and 90 percent satisfaction levels, as well as illustrating the impact of knock sensor-equipped vehicles on these six populations. At the current market penetration levels, inclusion of the knock sensor-equipped vehicles at their minimum (low-borderline) requirement reduces the population requirements relative to those calculated at their maximum (high-borderline) requirements by 0.1-0.8 (R+M)/2 at low satisfaction levels, and 0.2 to 0.4 (R+M)/2 at high satisfaction levels.

FBRU (R+M)/2 OCTANE NUMBER REQUIREMENTS

1985 AND CHANGES FROM 1984

Weighted Population	KS-H**	from 1984	KS-L***	from 1984
50% Satisfaction				
All US and Imported Vehicles (27.54%)*	86.4	-0.3	85.9	-0.6
All US and Imported Cars (28.07%)	86.2	-0.7	85.8	-0.9
All US Vehicles (32.69%)	86.5	-0.7	85.7	-1.1
All US Cars (33.33%)	86.3	-1.1	85.7	-1.4
All Imported Vehicles (3.08%)	86.3	+0.9	86.2	+0.8
All Knock-Sensor Vehicles	86.7	+0.2	83.8	+2.1
90% Satisfaction				
All US and Imported Vehicles (27.54%)*	90.1	-1.0	89.8	-1.1
All US and Imported Cars (28.07%)	90.0	-0.9	89.6	-1.1
All US Vehicles (32.69%)	90.4	-0.7	90.2	-0.8
All US Cars (33.33%)	90.3	-0.6	90.0	-0.8
All Imported Vehicles (3.08%)	88.9	-1.6	88.6	-1.9
All Knock-Sensor Vehicles	91.5	+0.8	89.1	+1.3

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* Knock sensor-equipped vehicles as percent of the associated population.

** KS-H = Population with knock sensor-equipped vehicles at maximum (high-borderline) requirement.

*** KS-L = Population with Knock Sensor-Equipped Vehicles at minimum (low-borderline) requirement.

Maximum octane requirements for the select models at the 50 percent and 90 percent satisfaction levels for FBRU fuels are summarized in the following table:

SELECT MODELS

MAXIMUM FBRU OCTANE NUMBER REQUIREMENTS

Select Model	No. Tested	(R+M)/2 50% Sat.	(R+M)/2 90% Sat.
DHD T22A3/KED T22A3/KHD T22A3/ KKD T22A3/PKD T22A3	12	86.2	89.9
ME4 216A3/OE4 216A3	11	88.3	91.0
MTX T23A3/OTX T23A3	15	86.4	88.7
HNL P30A3/INL P30A3/LNL P30A3 (High-Borderline)	17	87.5	90.8
HNL P30A3/INL P30A3/LNL P30A3 (Low-Borderline)	16	84.4	87.3
IC3 P38A4/LC3 P38A4 (High-Borderline)	14	84.0	90.0
IC3 P38A4/LC3 P38A4 (Low-Borderline)	13	81.9	86.4
HGA 238A3/IGA 238A3/LGA 238A3 (High-Borderline)	11	85.4	88.3
IBY 450A4/LBY 450A4	12	88.4	90.7
IJP T20A3/LJP T20A3/NJP T20A3	13	85.2	91.1
GJW P28A3/NJW P28A3	11	81.8	85.3

Incidence of part-throttle knock with FBRU greater than maximum-throttle knock was slightly more in 1985 than in 1984. Maximum requirements occurred at part-throttle in 10.4 percent of all 1985 model vehicles with FBRU fuels (39 of 374 vehicles), compared with 9.3 percent in 1984 and 16.4 percent in 1983.

In the 1985 Survey, 36.9 percent of the weighted vehicle population knocked on tank fuel, which compares with 49.3 percent in the 1984 Survey and 44.6 percent in the 1983 Survey.

III. TEST VEHICLES

This year's Survey tested a total of 374 1985 model vehicles, compared with 407 vehicles in the 1984 Survey. The analysis of the data included 342 passenger cars (282 US and 60 imports) and 32 vans and light-duty trucks (27 US and 5 imports). Also included are 103 knock sensor-equipped vehicles (94 US passenger cars, 7 US trucks and vans, and 2 imported passenger cars).

A sufficient amount of data (eleven or more vehicles) was obtained for nine specific select models. These select models are described in Table I.

In the 1985 Survey, 84 percent of the transmissions were automatic. Sixty-seven percent of the automatics were three-speeds, and the rest four-speeds. The manual transmissions were divided into fifteen four-speeds and forty-four five-speeds. Ninety-two percent of the surveyed vehicles were air-conditioned.

Table II shows the distribution of odometer mileage for both the 1985 and 1984 Surveys. The 1985 distribution is shown as a bar chart in Figure 1. The average odometer mileage was 12,343. The weighted average displacement in 1985 was 3.16 ℓ, compared with 3.09 in 1984. The weighted average compression ratio in 1985 was 8.81, compared with 8.69 in 1984.

The basic timing was adjusted to the manufacturer's recommended setting prior to testing. A total of forty-five vehicles were adjusted; thirty-nine were two or more degrees off from the manufacturer's setting. The number of vehicles and their deviation in spark setting are shown in Table III.

Participants were requested to rate specific vehicle models in a pattern which would minimize data bias due to differences among testing laboratories and vehicles. To accomplish this, the United States was divided into four geographical areas, and laboratories within each geographical area were requested to test specific vehicles.

IV. REFERENCE FUELS

Three series of reference fuels were used in the 1985 Survey:

- Primary Reference (PR) Fuels;
- Average Sensitivity Full-Boiling Range Unleaded (FBRU) Reference Fuels with sensitivities similar to those of normal commercial gasoline; and

- High-Sensitivity Full-Boiling Range Unleaded (FBRSU) Reference Fuels with sensitivities about two octane numbers higher than the FBRU fuels.

A. PR Fuels

Isooctane and normal heptane, meeting ASTM specifications, were blended in two octane number increments from 76 to 82 octane number, and in one octane number increments from 82 to 100 octane number.

B. FBRU Reference Fuels

FBRU fuels were prepared from three base blends (RMFD-356-85/86, RMFD-357-85/86, and RMFD-358-85/86) in two octane number increments from 78 to 84 RON, and in one octane number increments from 84 to 103 RON.

The base blends were prepared from normal refinery components. Inspection data furnished by the supplier are compared with those of the 1984 FBRU fuels in Appendix C, Table C-I. The physical inspections of the 1985 fuels were similar to those of the 1984 fuels; however, the volatility was a little higher in 1985.

The composition and average laboratory octane data for the 1985 FBRU reference fuel series are presented in Appendix C, Table C-II, along with the sensitivities as compared with the 1984 fuels. The sensitivities of the 1985 fuels were higher than those of the 1984 fuels between 86 and 103 RON.

C. FBRSU Reference Fuels

FBRSU fuels were prepared from three base blends (RMFD-359-85/86 RMFD-360-85/86, and RMFD-361-85/86) in two octane number increments from 78 to 84 RON, and in one octane number increments from 84 to 103 RON.

The base blends were prepared from normal refinery components. Inspection data furnished by the supplier are compared with those of the 1984 base blends in Appendix C, Table C-III. The intermediate and high blends had lower volatility than the 1984 fuels, while the low blend had higher volatility.

The laboratory blending octane data for the 1985 FBRSU reference fuels are presented in Table C-IV, along with the sensitivities as compared with the 1984 fuels. The sensitivities of the 1985 fuels were higher than the 1984 fuels, particularly in the mid-octane range fuels.

V. TEST TECHNIQUE

The test technique (CRC Designation E-15-85, Attachment 2 of Appendix D) specified that octane number requirements be determined at level road acceleration conditions. The order of fuel testing was tank fuel, FBRSU fuels, FBRU fuels, and PR fuels. Knocking tendencies were investigated using both maximum-throttle and part-throttle acceleration techniques.* Part-throttle was investigated in each vehicle to determine if the part-throttle requirement was higher than the maximum-throttle requirement. In these cases, the part-throttle requirement search was conducted with all three fuels. Part-throttle requirements were also determined with FBRU fuels down to four Research octane numbers below the maximum requirement at maximum-throttle.

The octane number requirement of a vehicle is defined as the (R+M)/2, Research, or Motor octane number of the highest octane test fuel producing borderline knock. The maximum octane number requirement of the vehicle is defined as the highest requirement at either maximum- or part-throttle. Maximum octane number requirements were obtained over the speed range with PR fuels only. For vehicles equipped with knock sensors, the technique identifies the highest octane fuel that gives borderline knock (maximum or high-borderline requirement) and the lowest octane fuel that gives borderline knock (minimum or low-borderline requirement). Requirements are expressed as the (R+M)/2 octane number, Research octane number (RON), and Motor octane number (MON) of the reference fuel which produces knock that is recurrent and repeatable at the lowest audible level.

Of the fifteen laboratories participating in the 1985 Survey, three used level roads and twelve used chassis dynamometers. Eighty-two percent of the cars were tested on chassis dynamometers.

Average test temperature was 69°F, with a barometric pressure average of 29.91 inches Hg and average humidity of 56.57 grains per pound. Test conditions for individual observations are reported in Appendix E.

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* Maximum-throttle is either full-throttle for manual transmissions or widest throttle position (detent) that does not cause the transmission to downshift for automatic transmissions.

VI. DISCUSSION OF RESULTS

A. Distribution of Maximum Octane Number Requirements

The octane number requirement data were used to prepare satisfaction curves and tables for the following samples of 1985 model vehicles:

(1) US and Imported Vehicles,
(2) US and Imported Cars,
(3) US Vehicles,
(4) US Cars,
(5) Imported Vehicles, and
(6) US and Imported Knock-Sensor Vehicles.

Maximum (R+M)/2, RON, and MON requirements and 95 percent confidence limits for the six categories at 50 percent and 90 percent satisfaction are shown in Table IV. In preparing the curves and tables, the octane number requirement data were weighted in accordance with final 1985 model-year production data, and with US sales figures in the case of imports. Each curve and table, therefore, provides an estimate of the distribution of octane number requirements of the appropriate vehicle population on the road. The procedure for assigning weighting factors and for calculating the octane number requirement distributions is described in Appendix F.

Vehicles equipped with knock sensors were included in the 1985 models tested. The vehicles with knock sensors were tested for maximum (high-borderline) octane number requirements and minimum (low-borderline) octane number requirements. Octane number requirement distributions were calculated for each group of vehicles using the requirements from those vehicles with knock sensors rated at maximum (high-borderline) requirement and with their ratings at minimum (low-borderline) requirement. Maximum octane number requirements for the 1985 model vehicles were considered to be the requirements which included the knock sensor-equipped vehicles at the maximum (high-borderline) requirement.

Requirements are expressed as the (R+M)/2, Research, and Motor octane numbers of the reference fuel which produced knock that was recurrent and repeatable at the lowest audible level. (This definition of borderline knock was used for the first time in the 1984 Survey.)

It should also be noted that the primary analyses used in this report are based upon (R+M)/2 octane number requirements, rather than upon Research octane number requirements as in previous reports.

1. US and Imported Vehicles

In the 1985 Survey, maximum octane number requirements were determined on 374 vehicles with PR, FBRU, and FBRSU fuels. One hundred and three of the vehicles were equipped with knock sensors.

Maximum (R+M)/2 octane number requirements for all three reference fuels are shown in Figures 2, 3, and 4. Each plot compares the requirements with US and imported vehicles, including knock-sensor vehicles, with ratings at the maximum (high-borderline) level and the minimum (low-borderline) level. The maximum (R+M)/2 octane number requirements for all three reference fuels are plotted in Figure 5. The octane number requirement distributions for FBRU and FBRSU fuels are similar. Maximum (R+M)/2, Research, and Motor octane number requirements are listed in Table V, with minimum requirements listed in Table VI. The 50 percent and 90 percent satisfaction level requirements are:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Vehicles)

Fuel	50% Satisfied			90% Satisfied		
	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	88.8	88.8	88.8	92.8	92.8	92.8
FBRU	86.4	90.6	82.3	90.1	95.1	85.2
FBRSU	86.2	91.7	80.7	89.9	96.0	83.8

Differences between 1985 and 1984 Survey maximum (R+M)/2, Research, and Motor octane number requirements are also shown in Tables V and VI for all three fuel series. Distributions of the 1985 and 1984 maximum (R+M)/2 requirements are shown in Figure 6 for FBRU fuels. The differences at the 50 percent and 90 percent satisfaction levels are:

DIFFERENCES BETWEEN 1985 AND 1984 MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Vehicles)

Fuel	50% Satisfied			90% Satisfied		
	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
FBRU	-0.3	+0.1	-0.7	-1.0	-0.7	-1.2
FBRSU	-0.4	+0.2	-1.0	-1.1	-0.8	-1.3

Confidence limits for maximum octane number requirement distributions are given in Appendix G, Table G-I. The 95 percent confidence limits for (R+M)/2 octane number requirements varied from ±0.28 to ±0.32 at the 50 percent satisfaction level, and from ±0.38 to ±0.44 at the 90 percent satisfaction level.

2. US and Imported Cars

Maximum octane number requirements were determined on 342 US and imported cars with PR, FBRU, and FBRSU fuels.

Maximum (R+M)/2, RON, and MON requirements on all three fuel series are given in Table VII, with minimum requirements given in Table VIII. The maximum (R+M)/2 octane number requirement distributions for all three reference fuels are plotted in Figure 7. Maximum octane number requirements at the 50 percent and 90 percent satisfaction levels are:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Cars)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	88.1	88.1	88.1	93.0	93.0	93.0
FBRU	86.2	90.4	82.1	90.0	95.0	85.1
FBRSU	86.0	91.5	80.6	90.2	96.3	84.1

Differences between the 1985 and 1984 Survey maximum (R+M)/2, RON, and MON requirements are also shown in Tables VII and VIII for PR, FBRU, and FBRSU fuels. Differences between 1985 and 1984 data at the 50 percent and 90 percent satisfaction levels are:

DIFFERENCES BETWEEN 1985 AND 1984 MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Cars)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	-0.9	-0.9	-0.9	+0.2	+0.2	+0.2
FBRU	-0.7	-0.3	-1.0	-0.9	-0.6	-1.1
FBRSU	-0.9	-0.4	-1.3	-0.8	-0.5	-1.0

Confidence limits for maximum octane number requirement distributions of 1985 US and imported cars are given in Appendix G, Table G-I. The 95 percent confidence limits for (R+M)/2 requirements varied from ±0.31 to ±0.41 at the 50 percent satisfaction level, and from ±0.42 to ±0.55 at the 90 percent satisfaction level.

3. US Vehicles

Maximum octane number requirements were determined on 309 US vehicles with PR, FBRU, and FBRSU fuels.

Distributions of maximum (R+M)/2 octane number requirements are plotted in Figure 8 for the three fuel series. Maximum (R+M)/2, RON, and MON requirements for the US vehicles are given in Table IX, with minimum requirements given in Table X. Octane number requirements at the 50 percent and 90 percent satisfaction levels are:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	88.8	88.8	88.8	92.7	92.7	92.7
FBRU	86.5	90.7	82.3	90.4	95.5	85.4
FBRSU	86.2	91.7	80.7	90.2	96.3	84.1

Differences between maximum octane number requirements of 1985 and 1984 US vehicles for the three fuel series are also given in Tables IX and X, in terms of (R+M)/2, RON, and MON. Differences between octane number requirements of 1985 and 1984 US vehicles at the 50 percent and 90 percent satisfaction levels are:

DIFFERENCES BETWEEN 1985 AND 1984 MAXIMUM OCTANE NUMBER REQUIREMENTS

(US Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	-0.5	-0.5	-0.5	-0.3	-0.3	-0.3
FBRU	-0.7	-0.3	-1.0	-0.7	-0.3	-1.0
FBRSU	-0.8	-0.3	-0.3	-0.9	-0.7	-1.1

Confidence limits for maximum octane number requirement distributions of 1985 US vehicles are tabulated in Appendix G, Table G-I. The 95 percent confidence limits for (R+M)/2 octane number requirements were from ±0.34 to ±0.36 at the 50 percent satisfaction level, and from ±0.46 to ±0.50 at the 90 percent satisfaction level.

4. US Cars

Maximum octane number requirements were determined on 282 US cars with PR, FBRU, and FBRSU fuels.

Distributions of maximum (R+M)/2 octane number requirements are plotted in Figure 9 for the three fuel series. Maximum (R+M)/2, RON, and MON requirements for all three fuel series are given in Table XI, with minimum requirements given in Table XII. Maximum octane number requirements for the 50 percent and 90 percent satisfaction levels are:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US Cars)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	88.1	88.1	88.1	93.1	93.1	93.1
FBRU	86.3	90.4	82.1	90.3	95.4	85.3
FBRSU	86.0	91.4	80.6	90.6	96.8	84.5

Differences between the maximum (R+M)/2, RON, and MON requirements of US cars tested in the 1985 and 1984 Surveys are also given in Tables XI and XII for all three fuel series. The differences at the 50 percent and 90 percent satisfaction levels are:

DIFFERENCES BETWEEN 1985 AND 1984 MAXIMUM OCTANE NUMBER REQUIREMENTS

(US Cars)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	-1.2	-1.2	-1.2	+0.3	+0.3	+0.3
FBRU	-1.1	-0.9	-1.4	-0.6	-0.2	-0.9
FBRSU	-1.3	-1.0	-1.4	-0.5	-0.2	-0.7

Confidence limits for maximum octane number requirement distributions of 1985 US cars are given in Appendix G, Table G-I. The 95 percent confidence limits for (R+M)/2 octane number requirements varied between ±0.36 and ±0.46 at the 50 percent satisfaction level, and between ±0.50 and ±0.62 at the 90 percent satisfaction level.

5. Imported Vehicles

Maximum octane number requirements were determined on sixty-five imported vehicles with PR, FBRU, and FBRSU fuels. Maximum (R+M)/2 octane number requirements for all three reference fuel series are plotted in Figure 10. Maximum octane number requirements in terms of (R+M)/2, RON, and MON are given in Table XIII, with minimum requirements given in Table XIV. The 50 percent and 90 percent satisfaction level maximum octane number requirements are:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(Imported Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	88.8	88.8	88.8	93.1	93.1	93.1
FBRU	86.3	90.5	82.2	88.9	93.7	84.1
FBRSU	86.2	91.6	80.7	88.9	94.9	83.0

Differences between the maximum (R+M)/2, RON, and MON requirements of imported vehicles in the 1985 and 1984 Surveys are also given in Tables XIII and XIV for all three fuel series. The differences at the 50 percent and 90 percent satisfaction levels are:

DIFFERENCES BETWEEN 1985 AND 1984 MAXIMUM OCTANE NUMBER REQUIREMENTS

(Imported Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	+0.6	+0.6	+0.6	0.0	0.0	0.0
FBRU	+0.9	+1.6	+0.3	-1.6	-1.4	-1.7
FBRSU	+1.2	+3.0	+0.3	-1.2	-0.8	-1.4

Confidence limits for maximum octane number requirement distributions of 1985 imported vehicles are tabulated in Appendix G, Table G-I. The 95 percent confidence limits for (R+M)/2 octane number requirements were from ±0.52 to ±0.82 at the 50 percent satisfaction level, and from ±0.70 to ±1.11 at the 90 percent satisfaction level.

6. US and Imported Knock-Sensor Vehicles Only

Maximum octane number requirements (high-borderline) were determined on 103 US and imported vehicles containing knock sensors on PR, FBRU, and FBRSU fuels. Minimum (low-borderline) octane number requirements were determined on seventy-six vehicles.

The distributions of maximum (R+M)/2 octane number requirements at the maximum (high-borderline) and the minimum (low-borderline) levels are shown in Figures 11 and 12, respectively, for the three fuel series. Maximum (R+M)/2, RON, and MON requirements for all three fuel series are given in Table XV, with minimum requirements given in Table XVI. Maximum octane number requirements for the 50 percent and 90 percent satisfaction levels are:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(1985 US and Imported Knock Sensor Vehicles Only)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	89.2	89.2	89.2	94.7	94.7	94.7
FBRU	86.7	90.9	82.5	91.5	96.7	86.3
FBRSU	85.9	91.4	80.5	91.3	97.5	85.1

Differences between 1985 and 1984 Survey maximum (R+M)/2, RON, and MON requirements are also shown in Table XV and XVI. Distributions of maximum (R+M)/2 octane number requirements are shown in Figure 13 for FBRU fuels. The differences at the 50 percent and 90 percent satisfaction levels are:

DIFFERENCES BETWEEN 1985 AND 1984 MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Knock Sensor Vehicles Only)

	50% Satisfied			90% Satisfied		
Fuel	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	+0.2	+0.2	+0.2	+2.3	+2.3	+2.3
FBRU	+0.2	+0.6	-0.3	+0.8	+1.4	+0.3
FBRSU	-0.3	+0.4	-0.8	+0.3	+0.6	0.0

The differences between the maximum octane number requirements of 103 vehicles tested, and the minimum octane number requirements of 76 vehicles are:

DIFFERENCES BETWEEN MAXIMUM AND MINIMUM OCTANE NUMBER REQUIREMENTS

(1985 US and Imported Knock Sensor Vehicles Only)

Fuel	50% Satisfied			90% Satisfied		
	(R+M)/2	RON	MON	(R+M)/2	RON	MON
PR	+3.3	+3.3	+3.3	+1.8	+1.8	+1.8
FBRU	+2.9	+3.7	+2.1	+2.4	+2.8	+2.1
FBRSU	+2.4	+3.2	+1.8	+2.7	+3.0	+2.5

Confidence limits for maximum octane number requirement distributions of 1985 US and imported knock-sensor vehicles only are given in Appendix G, Table G-I. The 95 percent confidence limits for (R+M)/2 octane number requirements (high-borderline) varied between $\pm$0.66 and $\pm$0.74 at the 50 percent satisfaction level, and between $\pm$0.89 and $\pm$1.00 at the 90 percent satisfaction level.

The 95 percent confidence limits for (R+M)/2 octane number requirements (low-borderline) varied between $\pm$0.82 and $\pm$1.18 at the 50 percent satisfaction level, and between $\pm$1.10 and $\pm$1.59 at the 90 percent satisfaction level.

B. Part-Throttle Requirements

The throttle positions for maximum octane number requirements of tested vehicles were reported as maximum-throttle or part-throttle. In the 1985 Survey, 39 of 374 vehicles (10.4 percent) had part-throttle octane number requirements greater than their maximum-throttle octane number requirements. The percentages of all vehicles having maximum requirements at part-throttle were 9.3 percent in 1984 and 16.4 percent in 1983.

C. Select Models

Nine select models, representing nine engine-chassis combinations, were tested. The select models tested in this year's Survey included three knock sensor-equipped models. The identification and specifications of the engine-chassis combinations of the select models are in Table I.

Maximum octane number requirements for each select model at various satisfaction levels are listed in Tables XVII through XXV. The maximum (high-borderline) and minimum (low-borderline) octane number requirements for two knock sensor-equipped models are given in Tables XX and XXI. The minimum (low-borderline) octane requirements for the third knock sensor-equipped model in Table XXII were not determined.

D. Tank Fuel

Tank fuel was tested for incidence of knock on all vehicles. Owners' questionnaires, however, were obtained only when the vehicle tested had a regular driver and the ignition timing did not have to be reset.

1. Owner/Rater Comparisons of Tank Fuel Knock

For 143 vehicles, both owner and rater data were reported, and no adjustments of spark timing were made. The trained raters reported that 37.8 percent of the vehicles knocked, while the owners reported that 18.9 percent knocked, an owner/rater knock ratio of 0.50. The 37.8 percent of vehicles found to be knocking by trained raters is lower than in the 1984 Survey. These owner/rater comparisons of tank fuel knock for 1985, along with previous Survey data back to 1978, are presented in Table XXVI.

Tank fuel RON and MON data were reported for a total of 118 vehicles with both owner/rater data and no adjustments of spark timing. Ninety-five vehicles were reported to have tank fuel octane numbers less than 90.0 (R+M)/2. Trained observers reported knock on 48.4 percent of these, compared with 24.2 percent for owners. The other twenty-three vehicles had tank fuels greater than or equal to 90.0 (R+M)/2, 30.4 percent knocked according to trained raters and 8.7 percent according to owners.

2. Objectionable Versus Non-Objectionable Knock

Of the owners reporting tank-fuel knock with vehicles which had no change in spark timing, 51.9 percent found the knock to be objectionable, in comparison with 28.2 percent in the 1984 Survey. Comparisons of objectionable knock for 1978 through 1985 Surveys are also given in Table XXVI.

3. Tank Fuel Knock Reported by Trained Raters

On a total basis, tank fuel knock observations were reported for 327 of the 374 vehicles tested. The percentages of all 1985 vehicles knocking on tank fuel are shown in Table XXVII. On a weighted basis, 36.9 percent of the 1985 vehicles tested knocked

on tank fuel, compared with 49.3 percent in the 1984 Survey. (On an unweighted basis 40.7 percent of the 327 vehicles tested on tank fuel in the 1985 Survey were found to knock on tank fuel.)

The percentages of selected models knocking on tank fuel, also shown in Table XXVII varied from a low of 0.0 percent to a high of 81.6 percent.

E. Engine Speed for Maximum Octane Number Requirements

Engine speeds at which maximum octane number requirements occurred for each select model are shown in Table XXVIII for PR, FBRU, and FBRSU fuels. Weighted data for all 1985 vehicles are shown in Table XXIX.

F. Speed Range Octane Number Requirement

Primary reference fuel octane number requirements were determined over a range of engine speeds from 1000 to 3750 rpm on 257 vehicles. Individual vehicle data are in Appendix H, Table H-I. For the nine select models, speed range data were analyzed on 90 cars. The mean PR fuel octane number requirement, standard deviation, and number of observations within each speed range are in Table H-II.

G. Gear Position for Maximum Requirements

The throttle/gear position for maximum octane number requirements on FBRU fuels is shown in Table XXX. Of the 374 vehicles tested, 315 (84.2 percent) were equipped with automatic transmissions and 59 (15.5 percent) were equipped with manual transmissions.

Maximum requirements at maximum-throttle occurred in 90.1 percent of the automatic transmission vehicles (16.6 percent in fourth gear, 45.5 percent in third gear, and 28.0 percent in second gear). Maximum requirements at part-throttle occurred in 9.9 percent of the automatic transmission vehicles (2.6 percent in fourth gear, 7.3 in third).

For manual transmission vehicles, 86.4 percent had maximum requirements at maximum-throttle (76.2 percent in fourth gear and 10.2 percent in third gear). Maximum requirements at part-throttle occurred in 13.6 percent of manual transmission vehicles (all in fourth gear). Fifth gear for five-speed manual transmissions was not examined per program instructions.

TABLES

AND

FIGURES

TABLE I

1985 SELECT MODEL SPECIFICATIONS

Model	Disp. Liters	Engine Type	Carb. Type	Comp. Ratio	Brake HP	Trans-mission
Chrysler Corporation:						
Reliant/Aries/Lancer/ LeBaron/GTS/600	2.2	L-4	TBI	9.0	99	Automatic
Ford Motor Company:						
Escort/Lynx	1.6	L-4	2-Bbl	9.0	80	Automatic
Tempo/Topaz	2.3	L-4	TBI	9.0	86	Automatic
General Motors Corporation:						
Grand Am/Calais/Somerset Regal (Knock Sensor)	3.0	V-6	PI	9.0	125	Automatic
Regency 98/Electra (Knock Sensor)	3.8	V-6	PI	8.0	125	Automatic*
Grand Prix/Cutlass/Regal (Knock Sensor)	3.8	V-6	2-Bbl	8.0	110	Automatic
Delta 88/LeSabre	5.0	V-8	4-Bbl	8.0	140	Automatic*
Cavalier/Firenza/Skyhawk	2.0	L-4	TBI	9.3	88	Automatic
Cavalier/Cimarron	2.8	V-6	PI	8.9	135	Automatic

* Four-speed transmission, all others are three-speed transmissions.

TABLE II

DISTRIBUTION OF ODOMETER MILEAGE

FOR TESTED VEHICLES

Mileage	No. of Vehicles Within Mileage Increments	
	1984 Vehicles	1985 Vehicles
0 - 1,999	0	0
2,000 - 3,999	0	0
4,000 - 5,999	0	0
6,000 - 7,999	95	78
8,000 - 9,999	65	81
10,000 - 11,999	58	78
12,000 - 13,999	41	31
14,000 - 15,999	48	29
16,000 - 17,999	32	19
18,000 - 19,999	27	16
20,000 - 24,999	27	27
25,000 - 29,999	10	10
30,000 +	4	5
No. of Vehicles	407	374
Average Mileage	12,793	12,343

TABLE III

1985 BASIC TIMING ADJUSTMENTS

Degrees From Manufacturer's Setting	No. of Vehicles	
	+	-
1	2	4
2	13	12
3	4	5
4	1	1
5	0	2
6	0	0
7	0	0
8	0	0
9	0	0
10	0	1
11+	0	0
	20	25
TOTAL	45	

TABLE IV

OCTANE NUMBER REQUIREMENTS WITH 95% CONFIDENCE LIMITS

	Fuel	No. Vehicles	(R+M)/2 50% Sat.	(R+M)/2 90% Sat.	Research Octane No. 50% Sat.	Research Octane No. 90% Sat.	Motor Octane No. 50% Sat.	Motor Octane No. 90% Sat.
Maximum Octane Number Requirements								
• US and Imported Vehicles	PR	374	88.8 ± 0.32	92.8 ± 0.44	88.8 ± 0.32	92.8 ± 0.44	88.8 ± 0.32	92.8 ± 0.44
	FBRU	374	86.4 ± 0.28	90.1 ± 0.38	90.6 ± 0.35	95.1 ± 0.48	82.3 ± 0.22	85.2 ± 0.29
	FBRSU	374	86.2 ± 0.30	89.9 ± 0.42	91.7 ± 0.36	96.0 ± 0.49	80.7 ± 0.25	83.8 ± 0.34
• US and Imported Cars	PR	342	88.1 ± 0.41	93.0 ± 0.55	88.1 ± 0.41	93.0 ± 0.55	88.1 ± 0.41	93.0 ± 0.55
	FBRU	342	86.2 ± 0.31	90.0 ± 0.42	90.4 ± 0.39	95.0 ± 0.52	82.1 ± 0.23	85.1 ± 0.32
	FBRSU	342	86.0 ± 0.35	90.2 ± 0.42	91.5 ± 0.41	96.3 ± 0.55	80.6 ± 0.29	84.1 ± 0.30
• US Vehicles	PR	309	88.8 ± 0.36	92.7 ± 0.48	88.8 ± 0.36	92.7 ± 0.48	88.8 ± 0.36	92.7 ± 0.48
	FBRU	309	86.5 ± 0.34	90.4 ± 0.46	90.7 ± 0.42	95.5 ± 0.56	82.3 ± 0.26	85.4 ± 0.35
	FBRSU	309	86.2 ± 0.36	90.2 ± 0.50	91.7 ± 0.43	96.3 ± 0.58	80.7 ± 0.30	84.1 ± 0.41
• US Cars	PR	282	88.1 ± 0.46	93.1 ± 0.62	88.1 ± 0.46	93.1 ± 0.62	88.1 ± 0.46	93.1 ± 0.62
	FBRU	282	86.3 ± 0.36	90.3 ± 0.50	90.4 ± 0.45	95.4 ± 0.61	82.1 ± 0.28	85.3 ± 0.38
	FBRSU	282	86.0 ± 0.42	90.6 ± 0.58	91.4 ± 0.50	96.8 ± 0.67	80.6 ± 0.35	84.5 ± 0.48
• Imported Vehicles	PR	65	88.8 ± 0.82	93.1 ± 1.11	88.8 ± 0.82	93.1 ± 1.11	88.8 ± 0.82	93.1 ± 1.11
	FBRU	65	86.3 ± 0.52	88.9 ± 0.70	90.5 ± 0.66	93.7 ± 0.89	82.2 ± 0.38	84.1 ± 0.51
	FBRSU	65	86.2 ± 0.56	88.9 ± 0.77	91.6 ± 0.67	94.9 ± 0.91	80.7 ± 0.46	83.0 ± 0.63
• US and Imported Knock-Sensor Vehicles	PR	103	89.2 ± 0.74	94.7 ± 1.00	89.2 ± 0.74	94.7 ± 1.00	89.2 ± 0.74	94.7 ± 1.00
	FBRU	103	86.7 ± 0.66	91.5 ± 0.89	90.9 ± 0.80	96.7 ± 1.08	82.5 ± 0.51	86.3 ± 0.70
	FBRSU	103	85.9 ± 0.68	91.3 ± 0.92	91.4 ± 0.80	97.5 ± 1.08	80.5 ± 0.56	85.1 ± 0.76

TABLE V

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US AND IMPORTED VEHICLES

(For Knock Sensor-Equipped Vehicles, Maximum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	83.7	-0.4	82.5	-0.2	85.6	-0.2	79.3	-0.3	82.1	-0.6	86.4	-0.4	77.7	-0.8
20	85.5	-0.7	83.7	-0.6	87.1	-0.5	80.3	-0.7	83.6	-0.4	88.4	+0.1	78.9	-0.7
30	86.6	-0.8	84.8	-0.5	88.5	-0.2	81.0	-0.8	84.9	-0.1	90.0	+0.4	79.8	-0.5
40	87.6	-0.6	85.8	-0.2	89.8	+0.1	81.8	-0.6	85.5	-0.3	90.8	+0.2	80.2	-0.8
50	88.8	-0.2	86.4	-0.3	90.6	+0.1	82.3	-0.7	86.2	-0.4	91.7	+0.2	80.7	-1.0
60	89.9	+0.2	87.0	-0.4	91.4	0.0	82.7	-0.8	86.9	-0.5	92.6	0.0	81.3	-1.0
70	90.6	+0.1	87.8	-0.5	92.3	-0.1	83.2	-1.0	87.8	-0.6	93.6	-0.1	82.0	-1.0
80	91.5	-0.1	88.7	-0.7	93.5	-0.2	83.9	-1.1	88.8	-0.7	94.8	-0.3	82.9	-1.1
90	92.8	-0.2	90.1	-1.0	95.1	-0.7	85.2	-1.2	89.9	-1.1	96.0	-0.8	83.8	-1.3
95	94.1	-0.2	91.9	-0.3	97.2	0.0	86.6	-0.6	91.0	-1.4	97.1	-1.3	84.8	-1.4
98	96.3	-1.0	93.4	-1.1	98.9	-0.8	88.0	-1.3	94.1	-0.2	100.6	0.0	87.6	-0.3
99	-	-	96.2	-0.7	101.8	-1.1	90.6	+0.4	-	-	-	-	-	-

TABLE VI

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US AND IMPORTED VEHICLES

(For Knock Sensor-Equipped Vehicles, Minimum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	82.4	-0.4	81.5	+0.1	84.3	0.0	78.6	+0.1	80.9	-0.6	85.0	-0.5	76.8	-0.8
20	84.7	-0.4	83.1	+0.4	86.4	-0.3	79.9	-0.4	82.8	-0.4	87.4	0.0	78.2	-0.8
30	86.0	-0.9	84.0	-0.8	87.5	-0.7	80.6	-0.8	83.9	-0.5	88.8	-0.1	79.1	-0.8
40	86.9	-1.1	85.0	-0.7	88.8	-1.0	81.2	-0.9	84.9	-0.5	90.0	-0.1	79.8	-0.9
50	88.0	-0.7	85.0	-0.6	89.9	-0.3	81.9	-0.8	85.6	-0.7	91.0	-0.2	80.3	-1.1
60	89.0	-0.5	86.5	-0.7	90.7	-0.4	82.3	-1.1	86.4	-0.8	91.9	-0.3	80.9	-1.2
70	90.2	-0.1	87.3	-0.7	91.8	-0.2	82.9	-1.0	87.3	-0.8	93.0	-0.4	81.6	-1.2
80	91.1	-0.2	88.4	-0.7	93.1	-0.3	83.7	-1.1	88.4	-0.9	94.4	-0.4	82.5	-1.2
90	92.5	-0.5	89.8	-1.1	94.7	-0.9	84.9	-1.3	89.8	-1.0	95.9	-0.7	83.7	-1.2
95	93.7	-0.7	91.8	-0.2	97.0	0.0	86.5	-0.6	90.8	-1.4	96.9	-1.4	84.6	-1.5
98	96.9	-0.5	93.2	-0.9	98.7	-0.6	87.8	-1.1	92.9	-1.4	99.3	-1.3	86.5	-1.4
99	98.9	-	94.5	-	100.0	-	89.0	-	-	-	-	-	-	-

TABLE VII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US AND IMPORTED CARS

(For Knock Sensor-Equipped Vehicles, Maximum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	83.3	-0.9	82.1	+0.1	85.1	-0.8	79.1	-0.5	82.1	-0.6	86.5	-0.4	77.7	-0.9
20	85.1	-1.1	83.5	-0.9	86.8	-0.9	80.2	-0.9	83.4	-0.7	88.2	-0.3	78.7	-1.0
30	86.2	-1.2	84.4	-1.0	87.9	-1.0	80.8	-1.1	84.7	-0.5	89.7	-0.2	79.6	-1.0
40	87.1	-1.1	85.5	-0.7	89.4	-0.5	81.6	-0.9	85.4	-0.6	90.7	-0.2	80.1	-1.1
50	88.1	-0.9	86.2	-0.7	90.4	-0.3	82.1	-1.0	86.0	-0.9	91.5	-0.4	80.6	-1.3
60	89.2	-0.5	86.9	-0.7	91.2	-0.4	82.6	-1.1	86.8	-0.9	92.4	-0.5	81.2	-1.3
70	90.2	-0.3	87.7	-0.7	92.2	-0.4	83.2	-1.1	87.8	-0.8	93.6	-0.4	82.0	-1.2
80	91.3	-0.3	88.7	-0.7	93.5	-0.3	83.9	-1.1	88.9	-0.7	94.8	-0.4	82.9	-1.1
90	93.0	+0.2	90.0	-0.9	95.0	-0.6	85.1	-1.1	90.2	-0.8	96.3	-0.5	84.1	-1.0
95	94.6	+0.8	91.7	-0.3	96.9	0.0	86.4	-0.7	91.8	-0.3	98.0	-0.2	85.5	-0.5
98	98.3	+3.1	95.5	+1.9	101.0	+3.0	89.9	+1.5	94.9	+1.5	101.4	+1.7	88.4	+1.3
99	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE VIII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US AND IMPORTED CARS

(For Knock Sensor-Equipped Vehicles, Minimum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	81.9	-1.5	81.1	-0.7	83.9	-0.8	78.3	-0.5	80.5	-1.4	84.6	-1.3	76.5	-1.4
20	84.2	-1.3	82.8	-1.0	86.0	-1.0	79.6	-1.0	82.6	-0.9	87.2	-0.6	78.1	-1.1
30	85.7	-1.3	83.9	-1.1	87.3	-1.1	80.5	-1.1	83.9	-0.9	88.7	-0.7	79.0	-1.2
40	86.6	-1.4	84.8	-1.1	88.6	-0.9	81.1	-1.2	85.0	-0.8	90.1	-0.4	79.8	-1.2
50	87.6	-1.2	85.8	-0.9	89.8	-0.7	81.8	-1.1	85.6	-1.0	90.9	-0.6	80.3	-1.4
60	88.6	-0.9	86.5	-0.9	90.6	-0.7	82.3	-1.2	86.3	-1.1	91.8	-0.8	80.8	-1.5
70	89.7	-1.1	87.2	-0.9	91.6	-0.6	82.8	-1.3	87.3	-1.0	93.0	-0.6	81.6	-1.4
80	90.9	-0.4	88.3	-0.8	93.0	-0.4	83.6	-1.2	88.4	-0.9	94.3	+0.3	82.5	-1.3
90	92.6	-0.2	89.6	-1.1	94.5	-0.9	84.7	-1.4	89.9	-0.8	96.0	+0.5	83.8	-1.1
95	94.3	+0.4	91.3	-0.5	96.5	-0.2	86.1	-0.8	91.6	-0.3	97.8	+0.8	85.4	-0.5
98	97.9	+2.5	93.7	+0.7	99.1	+1.0	88.2	+0.3	93.9	+0.5	100.4	+0.7	87.4	+0.3
99	99.3	+2.2	94.8	+0.7	100.3	+1.0	89.3	+0.4	-	-	-	-	-	-

TABLE IX

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US VEHICLES

(For Knock Sensor-Equipped Vehicles, Maximum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	83.3	-1.2	82.2	-1.4	85.3	-0.5	79.2	-1.2	81.8	-1.5	86.0	-1.6	77.5	-1.6
20	85.3	-1.3	83.6	-1.2	86.9	-1.3	80.3	-1.1	83.5	-1.0	88.2	-0.8	78.7	-1.3
30	86.4	-1.2	84.6	-1.1	88.3	-0.9	80.9	-1.2	84.9	-0.5	90.0	-0.1	79.8	-0.8
40	87.5	-1.0	85.8	-0.7	89.8	-0.4	81.8	-0.9	85.5	-0.5	90.8	-0.2	80.2	-1.1
50	88.8	-0.5	86.5	-0.7	90.7	-0.3	82.3	-1.0	86.2	-0.8	91.7	-0.3	80.7	-0.3
60	89.9	0.0	87.1	-0.7	91.5	-0.3	82.7	-1.1	87.0	-0.8	92.6	-0.4	81.3	-0.7
70	90.7	0.0	87.9	-0.7	92.4	-0.4	83.3	-1.1	87.9	-0.7	93.7	-0.3	82.1	-1.1
80	91.6	-0.1	89.0	-0.6	93.8	-0.2	84.2	-0.9	89.1	-0.6	95.1	-0.2	83.1	-1.0
90	92.7	-0.3	90.4	-0.7	95.5	-0.3	85.4	-1.0	90.2	-0.9	96.3	-0.7	84.1	-1.1
95	94.2	-0.2	92.3	+0.3	97.7	+0.7	87.0	-0.1	91.5	-1.0	97.7	-0.9	85.2	-1.2
98	96.9	-1.2	93.9	-0.9	99.4	-0.7	88.5	-1.1	94.6	+0.1	101.1	-0.8	88.0	-0.2
99	-	-	96.3	-	101.9	-	90.7	-	-	-	-	-	-	-

TABLE X

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US VEHICLES

(For Knock Sensor-Equipped Vehicles, Minimum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	82.1	-0.6	81.2	-0.3	84.0	-0.4	78.4	-0.2	80.5	-1.0	84.6	-0.8	76.5	-1.1
20	84.3	-1.1	82.9	-1.1	86.1	-1.1	79.7	-1.1	82.5	-1.3	87.0	-1.1	78.0	-1.4
30	85.7	-1.4	83.8	-1.3	87.3	-1.2	80.4	-1.3	83.7	-1.1	88.5	-0.9	78.9	-1.3
40	86.7	-1.4	84.7	-1.3	88.4	-1.3	81.0	-1.4	84.7	-1.0	89.7	-0.8	79.6	-1.4
50	87.8	-1.1	85.7	-1.1	89.7	-0.9	81.7	-1.4	85.5	-1.1	90.8	-0.7	80.2	-1.5
60	88.9	-0.8	86.5	-1.0	90.7	-0.8	82.3	-1.3	86.3	-1.2	91.9	-0.7	80.8	-1.6
70	90.1	-0.3	87.4	-0.9	91.8	-0.6	82.9	-1.3	87.3	-1.1	93.0	-0.7	81.6	-1.4
80	91.1	-0.3	88.6	-0.7	93.4	-0.3	83.9	-1.1	88.8	-0.6	94.7	-0.2	82.8	-1.0
90	92.5	-0.4	90.2	-0.8	95.2	-0.5	85.2	-1.1	90.1	-0.8	96.2	-0.6	84.0	-1.1
95	94.0	-0.5	92.2	+0.3	97.5	+0.7	86.8	-0.2	91.2	-1.1	97.4	-1.0	85.0	-1.2
98	97.3	-0.8	93.4	-0.7	98.8	-0.5	88.0	-0.9	93.2	-1.3	99.7	-1.2	86.7	-1.5
99	99.0	-	94.5	-	100.0	-	89.0	-	-	-	-	-	-	-

TABLE XI

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US CARS

(For Knock Sensor-Equipped Vehicles, Maximum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	83.1	-1.8	81.9	-2.0	84.9	-2.2	78.9	-1.8	81.9	-1.7	86.2	-1.7	77.6	-1.7
20	84.9	-1.9	83.4	-1.7	86.8	-1.7	80.1	-1.6	83.3	-1.6	88.0	-1.4	78.6	-1.7
30	86.2	-1.5	84.3	-1.7	87.9	-1.7	80.8	-1.6	84.6	-1.1	89.7	-0.8	79.6	-1.3
40	87.0	-1.6	85.4	-1.3	89.4	-1.1	81.5	-1.5	85.4	-1.1	90.6	-0.8	80.1	-1.5
50	88.1	-1.2	86.3	-1.1	90.4	-0.9	82.1	-1.4	86.0	-1.3	91.4	-1.0	80.6	-1.4
60	89.3	-1.7	87.0	-1.0	91.3	-0.7	82.7	-1.2	86.8	-1.2	92.4	-0.9	81.2	-1.6
70	90.4	-0.3	87.9	-0.8	92.5	-0.4	83.3	-1.2	87.8	-1.0	93.6	-0.6	82.0	-1.3
80	91.5	-0.1	88.9	-0.7	93.7	-0.3	84.1	-1.0	89.1	-0.6	95.1	-0.2	83.1	-1.0
90	93.1	+0.3	90.3	-0.6	95.4	-0.2	85.3	-0.9	90.6	-0.5	96.8	-0.2	84.5	-0.7
95	94.8	+1.1	92.3	+0.5	97.6	+0.9	86.9	0.0	92.4	+0.3	98.7	+0.5	86.0	0.0
98	99.1	+4.0	95.7	+2.0	101.2	+5.4	90.1	+1.6	95.1	+1.5	101.6	+1.6	88.5	+1.2
99	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE XII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US CARS

(For Knock Sensor-Equipped Vehicles, Minimum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	81.5	-2.3	80.8	-1.6	83.6	-1.9	78.1	-1.2	79.9	-2.3	83.9	-2.3	76.0	-2.2
20	83.8	-2.3	82.4	-2.0	85.6	-2.2	79.3	-1.8	82.3	-1.9	86.8	-1.9	77.9	-1.9
30	85.4	-1.9	83.8	-1.7	87.2	-1.8	80.4	-1.6	83.7	-1.6	88.5	-1.5	78.9	-1.7
40	86.5	-1.7	84.8	-1.6	88.5	-1.6	81.0	-1.7	84.9	-1.2	90.0	-0.9	79.8	-1.5
50	87.6	-1.5	85.7	-1.4	89.7	-1.3	81.7	-1.6	85.5	-1.5	90.8	-1.2	80.2	-1.8
60	88.7	-1.0	86.4	-1.3	90.6	-1.1	82.3	-1.4	86.2	-1.5	91.6	-1.3	80.7	-1.9
70	89.9	-0.6	87.3	-1.1	91.7	-0.8	82.9	-1.4	87.2	-1.3	92.8	-1.1	81.5	-1.6
80	91.1	-0.3	88.5	-0.8	93.2	-0.5	83.8	-1.1	88.6	-0.8	94.5	-0.4	82.6	-1.3
90	92.8	+0.1	90.0	-0.8	94.9	-0.5	85.0	-1.1	90.4	-0.4	96.5	-0.2	84.3	-0.7
95	94.8	+1.1	92.0	+0.3	97.3	+0.8	86.7	-0.1	92.0	+0.1	98.4	+0.5	85.8	-0.1
98	98.2	+3.2	93.9	+1.2	99.4	+1.7	88.4	+0.8	-	-	-	-	-	-
99	99.2	+2.0	94.7	+0.7	100.2	+1.0	89.2	+0.4	-	-	-	-	-	-

TABLE XIII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 IMPORTED VEHICLES

(For Knock Sensor-Equipped Vehicles, Maximum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	84.7	+1.7	83.1	+1.7	86.3	+2.0	79.8	+1.3	82.9	+1.1	87.5	+1.8	78.3	+0.5
20	86.1	-0.5	84.0	+1.6	87.5	+2.0	80.6	+1.2	84.1	+1.5	89.0	+2.3	79.2	+0.7
30	87.0	+1.0	85.3	+1.9	89.1	+2.6	81.4	+1.2	84.9	+1.7	90.0	+2.6	79.8	+0.8
40	87.9	+0.4	86.0	+1.3	90.0	+2.0	81.9	+1.6	85.6	+1.8	91.0	+3.0	80.3	+0.9
50	88.8	+0.6	86.3	+0.9	90.5	+1.6	82.2	+0.3	86.2	+1.2	91.6	+3.0	80.7	+0.3
60	89.8	+1.0	86.7	+0.8	91.0	+1.5	82.5	+0.2	86.8	+0.8	92.4	+2.6	81.2	0.0
70	90.5	+1.0	87.5	+1.0	92.0	+1.8	83.0	+0.2	87.5	+0.8	93.3	+1.6	81.8	0.0
80	91.5	+0.8	88.2	+0.7	92.8	+1.4	83.5	-0.1	88.2	+0.1	94.1	+0.7	82.4	-0.4
90	93.1	0.0	88.9	-1.6	93.7	-1.4	84.1	-1.7	88.9	-1.2	94.9	-0.8	83.0	-1.4
95	93.9	-0.2	89.8	-2.7	94.7	-2.8	84.8	-2.7	89.5	-2.3	95.5	-2.3	83.4	-2.4
98	-	-	-	-	-	-	-	-	-	-	-	-	-	-
99	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE XIV

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 IMPORTED VEHICLES

(For Knock Sensor-Equipped Vehicles, Minimum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	84.3	+1.3	82.7	+1.3	85.9	+1.6	79.5	+1.0	82.6	+0.9	87.1	+1.5	78.1	+0.3
20	85.8	+1.2	83.8	+1.4	87.3	+1.8	80.4	+1.0	83.8	+1.2	88.6	+1.9	79.0	+0.5
30	86.7	+0.9	84.8	+1.5	88.6	+2.1	81.1	+1.0	84.7	+1.5	89.7	+2.3	79.6	+0.6
40	87.6	+0.1	85.8	+0.9	89.8	+1.8	81.8	+0.5	85.4	+1.7	90.7	+2.7	80.1	+0.7
50	88.5	+0.3	86.2	+0.8	90.3	+1.4	82.1	+0.2	86.0	+1.0	91.4	+1.8	80.6	+0.2
60	89.5	+0.7	86.6	+0.7	90.8	+1.3	82.4	+0.1	86.6	+0.6	92.1	+1.3	81.0	-0.2
70	90.3	+0.8	87.2	+0.7	91.6	+1.4	82.8	0.0	87.3	+0.5	93.0	+1.3	81.6	-0.2
80	91.1	+0.4	87.9	+0.4	92.5	+1.1	83.3	-0.3	88.0	-0.1	93.8	+0.4	82.2	-0.6
90	92.5	-0.5	88.6	-1.9	93.4	-1.7	83.8	-2.1	88.7	-0.4	94.6	-1.2	82.7	-1.7
95	93.3	-0.8	89.1	-3.4	93.9	-3.6	84.2	-3.3	89.2	-2.6	95.2	-2.6	83.2	-2.6
98	93.9	-1.3	89.7	-4.0	94.7	-4.1	84.8	-3.7	89.7	-	95.8	-	83.7	-
99	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE XV

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US AND IMPORTED KNOCK SENSOR-EQUIPPED VEHICLES ONLY

(For Knock Sensor-Equipped Vehicles, Maximum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	83.8	+1.4	82.7	+1.5	85.9	+1.9	79.5	+1.2	81.9	+0.5	86.2	+0.9	77.6	+0.1
20	85.2	-0.2	83.5	-0.4	86.8	-0.3	80.1	-0.6	83.1	-0.3	87.7	+0.1	78.4	-0.8
30	86.2	-0.5	84.1	-0.7	87.6	-0.6	80.6	-0.8	84.5	-0.1	89.5	+0.4	79.5	-0.6
40	87.5	0.0	85.3	-0.5	89.2	-0.2	81.4	-0.8	85.2	-0.2	90.5	+0.4	80.0	-0.7
50	89.2	+0.2	86.7	+0.2	90.9	+0.6	82.5	-0.3	85.9	-0.3	91.4	+0.4	80.5	-0.8
60	90.4	+0.4	87.2	+0.1	91.6	+0.7	82.8	-0.5	87.0	0.0	92.6	+0.7	81.4	-0.6
70	91.4	+0.7	87.9	0.0	92.5	+0.6	83.3	-0.5	87.9	+0.1	93.7	+0.7	82.1	-0.5
80	92.5	+1.1	89.0	-0.1	93.8	+0.4	84.2	-0.6	88.9	-0.4	94.9	0.0	82.9	-0.9
90	94.7	+2.3	91.5	+0.8	96.7	+1.4	86.3	+0.3	91.3	+0.3	97.5	+0.6	85.1	0.0
95	96.9	+2.8	94.3	+1.6	99.8	+2.2	88.8	+1.0	94.4	+1.6	100.9	+2.0	87.9	+1.3
98	-	-	-	-	-	-	-	-	-	-	-	-	-	-
99	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE XVI

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 US AND IMPORTED KNOCK SENSOR-EQUIPPED VEHICLES ONLY

(For Knock Sensor-Equipped Vehicles, Minimum Octane Number Requirements Are Used)

Percent Satisfied	PR Fuels		FBRU Fuels						FBRSU Fuels					
			(R+M)/2		RON		MON		(R+M)/2		RON		MON	
	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984	1985	Δ from 1984
10	79.0	-0.1	78.8	-	81.3	-	76.3	-	78.5	+3.5	82.2	+3.1	74.8	+2.8
20	82.5	+1.5	81.6	+3.7	84.6	+2.3	78.7	+3.2	80.2	+1.7	84.1	+2.3	76.2	+1.1
30	84.0	+2.2	82.6	+2.7	85.8	+2.3	79.5	+1.7	81.5	+1.1	85.7	+1.5	77.3	+0.7
40	85.2	+2.7	83.2	+2.2	86.5	+2.7	80.0	+1.8	82.9	+1.7	87.5	+2.5	78.3	+1.0
50	85.9	+1.9	83.8	+2.1	87.2	+2.5	80.4	+1.6	83.5	+1.7	88.2	+2.5	78.7	+0.9
60	86.8	+1.3	84.2	+1.4	87.8	+1.9	80.7	+1.1	83.9	+1.2	88.8	+2.0	79.1	+0.6
70	87.9	+0.4	84.8	+0.1	88.5	+0.4	81.0	-0.4	84.6	0.0	89.6	+0.5	79.6	-0.5
80	89.0	-0.5	86.2	-0.5	90.3	-0.1	82.1	-0.8	85.8	-0.6	91.2	-0.1	80.4	-0.9
90	92.9	+1.9	89.1	+1.3	93.9	+2.1	84.2	+0.4	88.6	+0.6	94.5	+1.3	82.6	-0.1
95	97.3	+3.2	93.2	+4.5	98.6	+5.7	87.7	+3.2	93.1	+3.8	99.6	+4.8	86.7	+2.9
98	99.0	-	94.5	+2.3	100.0	+2.9	89.0	+1.8	-	-	-	-	-	-
99	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE XVII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 SELECT MODELS

MODEL: DHD T22A3/KED T22A3/KHD T22A3/KKD T22A3/PKD T22A3

Percent Satisfied	PR ON	FBRU			FBRSU		
		(R+M)/2	RON	MON	(R+M)/2	RON	MON
5	82.8	81.4	84.3	78.5	81.0	85.3	76.8
10	84.0	82.5	85.6	79.3	82.3	86.8	77.8
20	85.3	83.7	87.2	80.3	83.8	88.6	79.0
30	86.3	84.7	88.4	81.0	84.9	90.0	79.8
40	87.1	85.5	89.4	81.6	85.8	91.1	80.6
50	87.9	86.2	90.3	82.1	86.7	92.1	81.3
60	88.6	86.9	91.2	82.7	87.6	93.2	81.9
70	89.5	87.7	92.2	83.2	88.5	94.3	82.7
80	90.5	88.7	93.4	83.9	89.6	95.6	83.5
90	91.8	89.9	95.0	84.9	91.1	97.4	84.7
95	92.9	91.0	96.3	85.7	92.3	98.9	85.7
N	12	----------12----------			----------12----------		
Mean	87.875	86.200	90.292	82.108	86.692	92.125	81.258
Std. Dev.	3.061	2.924	3.671	2.178	3.432	4.146	2.721

TABLE XVIII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 SELECT MODELS

MODEL: ME4 216A3/OE4 216A3

Percent Satisfied	PR ON	FBRU (R+M)/2	FBRU RON	FBRU MON	FBRSU (R+M)/2	FBRSU RON	FBRSU MON
5	88.8	84.9	88.7	81.0	84.1	89.2	78.9
10	89.4	85.6	89.6	81.6	85.0	90.3	79.7
20	90.2	86.5	90.8	82.3	86.1	91.5	80.6
30	90.8	87.2	91.6	82.8	86.8	92.4	81.3
40	91.3	87.8	92.3	83.3	87.5	93.2	81.8
50	91.7	88.3	92.9	83.7	88.1	93.9	82.4
60	92.2	88.8	93.6	84.1	88.8	94.6	82.9
70	92.7	89.4	94.2	84.6	89.4	95.4	83.5
80	93.2	90.1	95.1	85.1	90.2	96.3	84.1
90	94.0	91.0	96.2	85.8	91.3	97.6	85.1
95	94.7	91.7	97.1	86.4	92.2	98.6	85.8
N	11	----------11----------			----------11----------		
Mean	91.727	88.300	92.909	83.691	88.136	93.909	82.364
Std. Dev.	1.794	2.097	2.548	1.649	2.475	2.844	2.106

TABLE XIX

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 SELECT MODELS

MODEL: MTX T23A3/OTX T23A3

Percent Satisfied	PR ON	FBRU			FBRSU		
		(R+M)/2	RON	MON	(R+M)/2	RON	MON
5	87.1	83.5	88.1	80.9	84.2	89.2	79.2
10	87.9	84.2	89.0	81.3	84.9	90.0	79.7
20	88.8	84.9	90.0	81.9	85.6	90.9	80.3
30	89.4	85.5	90.7	82.3	86.2	91.6	80.7
40	90.0	86.0	91.3	82.7	86.6	92.1	81.1
50	90.5	86.4	91.9	83.0	87.1	92.7	81.4
60	91.0	86.9	92.4	83.3	87.5	93.2	81.8
70	91.6	87.4	93.1	83.7	88.0	93.8	82.1
80	92.2	87.9	93.8	84.1	88.5	94.4	82.6
90	93.1	88.7	94.8	84.7	89.2	95.3	83.2
95	93.9	89.4	95.6	85.1	89.9	96.1	83.6
N	15	----------15----------			----------15----------		
Mean	90.500	86.437	91.867	83.007	87.057	92.667	81.447
Std. Dev.	2.044	1.780	2.264	1.298	1.710	2.085	1.337

TABLE XX

MAXIMUM (HIGH BORDERLINE) OCTANE NUMBER REQUIREMENTS - 1985 KNOCK-SENSOR SELECT MODEL

MODEL: HNL P30A3/INL P30A3/LNL P30A3

Percent Satisfied	PR ON	FBRU (R+M)/2	FBRU RON	FBRU MON	FBRSU (R+M)/2	FBRSU RON	FBRSU MON
5	84.9	83.3	86.7	79.9	82.0	86.5	77.4
10	86.1	84.2	87.8	80.6	83.1	87.9	78.3
20	87.4	85.4	89.2	81.5	84.5	89.6	79.4
30	88.4	86.2	90.2	82.1	85.5	90.7	80.2
40	89.2	86.9	91.1	82.6	86.3	91.8	80.9
50	90.0	87.5	91.9	83.1	87.1	92.7	81.6
60	90.8	88.2	92.7	83.6	87.9	93.7	82.2
70	91.7	88.8	93.6	84.1	88.8	94.7	82.9
80	92.6	89.7	94.6	84.7	89.8	95.9	83.7
90	94.0	90.8	96.0	85.6	91.2	97.5	84.9
95	95.1	91.7	97.1	86.3	92.3	98.9	85.8
N	17	----------17----------			----------17----------		
Mean	90.029	87.506	91.912	83.100	87.138	92.706	81.571
Std. Dev.	3.105	2.558	3.178	1.940	3.151	3.750	2.560

TABLE XX
(CONTINUED)

MINIMUM (LOW BORDERLINE) OCTANE NUMBER REQUIREMENTS - 1985 KNOCK-SENSOR SELECT MODEL

MODEL: HNL P30A3/INL P30A3/LNL P30A3

Percent Satisfied	PR ON	FBRU (R+M)/2	FBRU RON	FBRU MON	FBRSU (R+M)/2	FBRSU RON	FBRSU MON
5	81.3	80.7	83.4	78.0	79.3	83.1	75.5
10	82.3	81.5	84.4	78.6	80.3	84.3	76.3
20	83.5	82.5	85.6	79.4	81.6	85.9	77.2
30	84.4	83.2	86.5	79.9	82.5	87.0	78.0
40	85.1	83.8	87.3	80.4	83.2	87.9	78.6
50	85.8	84.4	88.0	80.8	84.0	88.8	79.1
60	86.5	85.0	88.7	81.2	84.7	89.7	79.7
70	87.3	85.6	89.5	81.7	85.5	90.6	80.3
80	88.1	86.3	90.4	82.2	86.4	91.7	81.0
90	89.4	87.3	91.6	82.9	87.6	93.3	82.0
95	90.4	88.1	92.6	83.5	88.7	94.6	82.8
N	16	----------16----------			----------16----------		
Mean	85.812	84.397	88.000	80.794	83.969	88.812	79.125
Std. Dev.	2.762	2.242	2.811	1.674	2.858	3.487	2.231

TABLE XXI

MAXIMUM (HIGH-BORDERLINE) OCTANE NUMBER REQUIREMENTS - 1985 KNOCK-SENSOR SELECT MODEL

MODEL: IC3 P38A4/LC3 P38A4

Percent Satisfied	PR ON	FBRU (R+M)/2	FBRU RON	FBRU MON	FBRSU (R+M)/2	FBRSU RON	FBRSU MON
5	75.7	76.2	78.1	74.3	75.6	78.9	72.3
10	77.6	77.9	80.2	75.7	77.4	81.0	73.7
20	79.9	80.0	82.7	77.3	79.6	83.6	75.6
30	81.5	81.5	84.5	78.5	81.2	85.5	76.9
40	83.0	82.8	86.1	79.5	82.5	87.1	78.0
50	84.3	84.0	87.5	80.4	83.8	88.6	79.0
60	85.6	85.2	89.0	81.3	85.1	90.1	80.0
70	87.0	86.4	90.5	82.3	86.4	91.7	81.2
80	88.7	87.9	92.4	83.5	88.0	93.5	82.5
90	91.0	90.0	94.9	85.1	90.2	96.1	84.3
95	92.9	91.7	97.0	86.5	92.0	98.3	85.8
N	14	----------14----------			----------14----------		
Mean	84.286	83.971	87.536	80.407	83.789	88.571	79.007
Std. Dev.	5.225	4.709	5.726	3.697	5.003	5.906	4.106

TABLE XXI
(CONTINUED)

MINIMUM (LOW-BORDERLINE) OCTANE NUMBER REQUIREMENTS - 1985 KNOCK-SENSOR SELECT MODEL

MODEL: IC3 P38A4/LC3 P38A4

Percent Satisfied	PR ON	FBRU			FBRSU		
		(R+M)/2	RON	MON	(R+M)/2	RON	MON
5	74.4	76.2	78.2	74.3	74.8	77.9	71.8
10	76.0	77.5	79.7	75.3	76.3	79.6	72.9
20	77.9	79.0	81.5	76.5	78.0	81.6	74.3
30	79.3	80.1	82.9	77.4	79.2	83.1	75.3
40	80.5	81.1	84.0	78.1	80.3	84.4	76.2
50	81.6	81.9	85.0	78.8	81.3	85.6	77.0
60	82.7	82.8	86.1	79.5	82.3	86.8	77.8
70	83.9	83.7	87.2	80.3	83.4	88.1	78.6
80	85.3	84.8	88.6	81.2	84.6	89.6	79.6
90	87.2	86.4	90.4	82.4	86.3	91.7	81.0
95	88.8	87.6	91.9	83.4	87.8	93.4	82.2
N	13	----------13----------			----------13----------		
Mean	81.615	81.931	85.038	78.823	81.292	85.615	76.969
Std. Dev.	4.388	3.469	4.176	2.769	3.932	4.718	3.153

TABLE XXII

MAXIMUM (HIGH-BORDERLINE) OCTANE NUMBER REQUIREMENTS - 1985 KNOCK-SENSOR SELECT MODEL

MODEL: HGA 238A3/IGA 238A3/LGA 238A3

Percent Satisfied	PR ON	FBRU (R+M)/2	FBRU RON	FBRU MON	FBRSU (R+M)/2	FBRSU RON	FBRSU MON
5	81.1	81.7	84.6	78.8	81.9	86.2	77.5
10	82.5	82.5	85.6	79.4	82.6	87.2	78.1
20	84.1	83.5	86.9	80.2	83.5	88.3	78.8
30	85.3	84.2	87.8	80.7	84.2	89.1	79.3
40	86.3	84.9	88.6	81.1	84.8	89.8	79.7
50	87.2	85.4	89.3	81.5	85.3	90.5	80.1
60	88.1	86.0	90.0	82.0	85.8	91.2	80.5
70	89.1	86.6	90.8	82.4	86.4	91.9	80.9
80	90.3	87.3	91.7	82.9	87.1	92.7	81.4
90	91.9	88.3	93.0	83.6	88.0	93.8	82.1
95	93.2	89.2	94.1	84.2	88.7	94.8	82.7
N	11	----------11----------			----------11----------		
Mean	87.182	85.432	89.318	81.545	85.300	90.500	80.100
Std. Dev.	3.676	2.261	2.883	1.640	2.091	2.598	1.586

TABLE XXIII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 SELECT MODELS

MODEL: IBY 450A4/LBY 450A4

Percent Satisfied	PR ON	FBRU			FBRSU		
		(R+M)/2	RON	MON	(R+M)/2	RON	MON
5	86.5	85.5	89.5	81.5	84.8	90.0	79.6
10	87.2	86.2	90.3	82.0	85.5	90.9	80.2
20	88.0	86.9	91.3	82.6	86.4	91.9	80.9
30	88.6	87.5	92.0	83.1	87.1	92.7	81.5
40	89.1	88.0	92.5	83.4	87.6	93.3	81.9
50	89.6	88.4	93.1	83.8	88.1	93.9	82.4
60	90.1	88.9	93.6	84.1	88.7	94.5	82.8
70	90.6	89.4	94.2	84.5	89.2	95.2	83.2
80	91.2	89.9	94.9	84.9	89.9	95.9	83.8
90	92.0	90.7	95.8	85.6	90.8	97.0	84.5
95	92.7	91.3	96.6	86.1	91.5	97.9	85.1
N	12	----------12----------			----------12----------		
Mean	89.583	88.433	93.083	83.783	88.133	93.917	82.350
Std. Dev.	1.881	1.768	2.151	1.386	2.043	2.392	1.698

TABLE XXIV

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 SELECT MODELS

MODEL: IJP T20A3/LJP T20A3/NJP T20A3

Percent Satisfied	PR ON	FBRU			FBRSU		
		(R+M)/2	RON	MON	(R+M)/2	RON	MON
5	79.2	77.7	79.8	75.5	78.0	81.6	74.4
10	80.5	79.3	81.8	76.8	79.3	83.2	75.4
20	82.0	81.3	84.3	78.4	80.9	85.2	76.7
30	83.1	82.8	86.1	79.5	82.1	86.6	77.6
40	84.0	84.0	87.6	80.5	83.1	87.8	78.4
50	84.8	85.2	89.0	81.4	84.0	88.9	79.1
60	85.7	86.4	90.4	82.3	84.9	90.0	79.9
70	86.6	87.6	91.9	83.3	85.9	91.2	80.6
80	87.7	89.1	93.7	84.4	87.1	92.6	81.6
90	89.2	91.1	96.2	86.0	88.7	94.5	82.8
95	90.4	92.7	98.2	87.3	90.0	96.1	83.9
N	13	----------13----------			----------13----------		
Mean	84.846	85.200	89.000	81.400	84.004	88.885	79.123
Std. Dev.	3.406	4.581	5.598	3.565	3.648	4.407	2.894

TABLE XXV

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 SELECT MODELS

MODEL: GJW P28A3/NJW P28A3

Percent Satisfied	PR ON	FBRU			FBRSU		
		(R+M)/2	RON	MON	(R+M)/2	RON	MON
5	79.0	77.4	79.6	75.2	77.9	81.4	74.4
10	80.0	78.4	80.7	76.0	78.9	82.6	75.1
20	81.1	79.6	82.1	77.0	80.1	84.1	76.1
30	81.9	80.4	83.2	77.6	80.9	85.2	76.7
40	82.5	81.1	84.0	78.2	81.7	86.1	77.3
50	83.2	81.8	84.9	78.8	82.4	86.9	77.8
60	83.8	82.5	85.7	79.3	83.1	87.8	78.4
70	84.5	83.2	86.6	79.9	83.8	88.7	79.0
80	85.3	84.1	87.6	80.6	84.7	89.7	79.6
90	86.4	85.3	89.0	81.6	85.9	91.2	80.6
95	87.3	86.3	90.2	82.3	86.9	92.4	81.3
N	11	----------11----------			----------11----------		
Mean	83.182	81.823	84.864	78.782	82.377	86.909	77.845
Std. Dev.	2.513	2.695	3.226	2.167	2.727	3.338	2.119

TABLE XXVI

OWNER/RATER COMPARISON OF TANK FUEL KNOCK

(For Vehicles with Both Owner and Rater Reports and No Adjustment of Spark Timing)

Model Year:	1985	1984	1983	1982	1981	1980	1979	1978
Fuel:	Unleaded	Unleaded	Unleaded	Unleaded	Unleaded	Unleaded*	Unleaded*	Unleaded*
No. of Reports:	143	149	129	144	149	218	196	105
% Knocking								
Trained Rater	37.8	51.7	59.7	47.9	43.6	51.1	52.6	50.5
Owner	18.9	26.2	29.5	25.0	29.5	31.2	26.0	32.4
Owner/Rater Ratio	0.50	0.51	0.49	0.52	0.68	0.61	0.49	0.64
% Owners Objecting								
Based on Total Reports	9.8	7.4	12.4	13.2	12.1	15.1	15.8	15.2
Based on Those Reporting Knock	51.9	28.2	42.1	52.8	40.9	48.5	60.8	46.9

* Some vehicles were designed for leaded fuels.

TABLE XXVII

TANK-FUEL KNOCK REPORTED BY TRAINED OBSERVERS

I. US and Imported Vehicles

Model Year	No. in Survey	Vehicles Tested on Tank Fuel	
		No. Tested	% Knocking (Wtg. Avg.)
1985	374	327	36.9
1984	407	358	49.3
1983	383	314	44.6
1982	434	342	41.6
1981	417	326	42.9
1980	429	374	49.9
1979	490	414	47.3
1978	434	338	47.2

II. 1985 Select Models •

	No. in Survey	No. Tested	% Knocking
DHD T22A3/KED T22A3/ KKD T22A3/PKD T22A3	12	11	45.5
ME4 216A3/OE4 216A3	11	11	63.6
MTX T23A3/OTX T23A3	15	12	83.3
HNL P30A3/INL P30A3/LNL P30A3 Knock Sensor, Maximum (High-Borderline)	17	17	52.9
IC3 P38A4/LC3 P38A4 Knock Sensor, Maximum (High-Borderline)	14	13	23.1
HGA 238A3/IGA P38A3/LGA P38A3 Knock Sensor, Maximum (High-Borderline)	11	10	50.0
IBY 450A4/LBY 450A4	12	11	81.8
IJP T20A3/LJP T20A3/NJP T20A3	13	11	9.1
GJW P28A3/NJW P28A3	11	6	0.0

TABLE XXVIII

ENGINE SPEEDS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 SELECT MODELS

Percent of Cars Having Maximum Requirements Within Specified Speed (rpm) Ranges

Model:	DHD T22A3/KED T22A3/KHD T22A3/ KKD T22A3/PKD T22A3			ME4 216A3/OE4 216A3			MTX T23A3/OTX T23A3		
Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU	PR	FBRU	FBRSU
SPEED RANGE									
1599 and Lower				64	46	37	46	46	33
1600 - 1999	8	8		18	18	18	27	20	20
2000 - 2399	59	59	59	9	36	36	20	20	26
2400 - 2799	25	33	25	9		9	7	7	7
2800 - 3199	8		8						7
3200 and Higher			8					7	7
No. of Cars	12	12	12	11	11	11	15	15	15

Model:	HNL P30A3/INL P30A3/LNL P30A3 Knock Sensor, Maximum (High-Borderline)			HNL P30A3/INL P30A3/LNL P30A3/ Knock Sensor, Minimum (Low-Borderline)			IC3 P38A4/LC3 P38A4 Knock Sensor, Maximum (High Borderline		
Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU	PR	FBRU	FBRSU
SPEED RANGE									
1599 and Lower	18	12	12	12	13	13	61	64	57
1600 - 1999	47	52	52	44	50	44	8	7	22
2000 - 2399	23	18	18	25	19	12	23	7	7
2400 - 2799	12	12	12	19	12	19	8	22	14
2800 - 3199		6	6		6	12			
3200 and Higher									
No. of Cars	17	17	17	16	16	16	13	14	14

TABLE XXVIII
(CONTINUED)

ENGINE SPEEDS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS - 1985 SELECT MODELS

Percent of Cars Having Maximum Requirements Within Specified Speed (rpm) Ranges

	Model:	IC3 P38A4/LC3 P38A4 Knock Sensor, Minimum (Low Borderline)			HGA 238A3/IGA 238A3/LGA 238A3 Knock Sensor, Maximum (High Borderline)			IBY 450A4/LBY 450A4		
SPEED RANGE	Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU	PR	FBRU	FBRSU
1599 and Lower		73	76	58	45	45	27		25	17
1600 - 1999		9	8	17	46	55	64	17	17	8
2000 - 2399		18	8	25	9		9	66	25	33
2400 - 2799			8					17	25	25
2800 - 3199									8	17
3200 and Higher										
No. of Cars		11	12	12	11	11	11	12	12	12

	Model:	IJP T20A3/LJP T20A3/NJP T20A3			GJW P28A3/NJW P28A3		
SPEED RANGE	Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU
1599 and Lower			15				
1600 - 1999							
2000 - 2399				8	18	36	18
2400 - 2799		38	39	46	18	18	18
2800 - 3199		31		15	9		18
3200 and Higher		31	46	31	55	46	46
No. of Cars		13	13	13	11	11	11

TABLE XXIX

ENGINE SPEEDS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS

Weighted % of Vehicles Having Requirements in Indicated (rpm) Ranges

All 1985 Vehicles

Maximum Requirements Engine Speed Range	PR Fuels	FBRU Fuels	FBRSU Fuels
1599 and Lower	26.4	28.5	20.8
1600 - 1999	29.3	20.7	19.7
2000 - 2399	22.3	20.0	20.5
2400 - 2799	12.4	15.0	16.0
2800 - 3199	6.5	9.6	13.6
3200 - 3599	1.9	3.2	4.3
3600 and Higher	1.2	3.0	5.1

TABLE XXX

THROTTLE/GEAR POSITION FOR 1985 MAXIMUM FBRU OCTANE NUMBER REQUIREMENTS

Throttle Position	Transmission Type & Gear		No. of Vehicles	% of Vehicles
----------Automatic Transmission----------				
Maximum	4-Speed:	4th	52	16.6
		3rd	22	7.0
		2nd	22	7.0
	3-Speed:	3rd	121	38.5
		2nd	66	21.0
Part	4-Speed:	4th	8	2.6
		3rd	2	0.6
	3-Speed	3rd	21	6.7
			314*	100.0
----------Manual Transmission----------				
Maximum	5-Speed:	4th	34	57.6
		3rd	3	5.1
	4-Speed:	4th	11	18.6
		3rd	3	5.1
Part	5-Speed:	4th	7	11.9
	4-Speed:	4th	1	1.7
			59	100.0

* One test vehicle not counted, because all FBRU fuels satisfied its octane number requirement.

FIGURE 1

DISTRIBUTION OF ODOMETER MILEAGE FOR 1985 MODEL VEHICLES TESTED

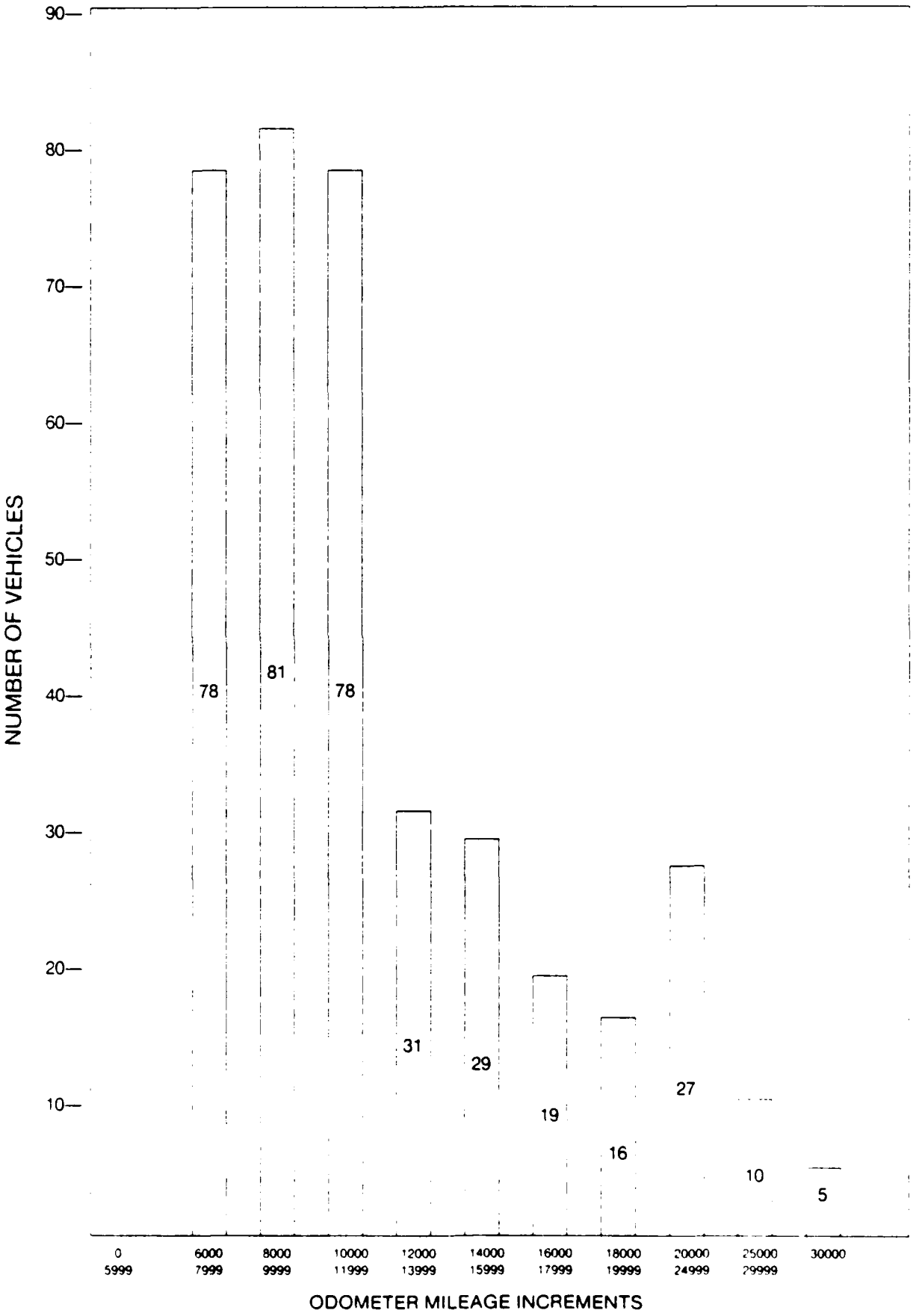


FIGURE 2

DISTRIBUTION OF MAXIMUM PR FUEL REQUIREMENTS
1985 U. S. AND IMPORTED VEHICLES

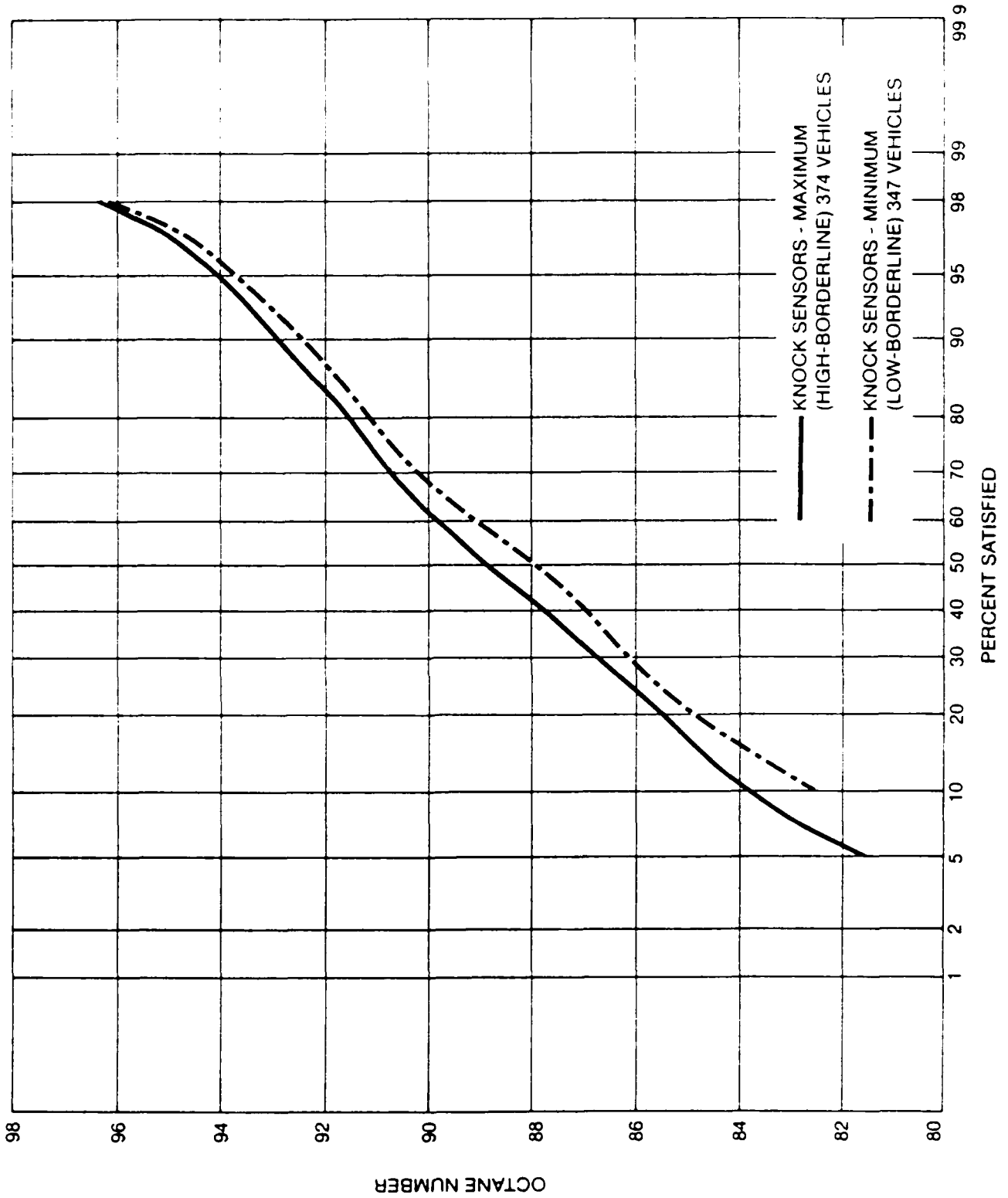


FIGURE 3

DISTRIBUTION OF MAXIMUM FBRU (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 U. S. AND IMPORTED VEHICLES

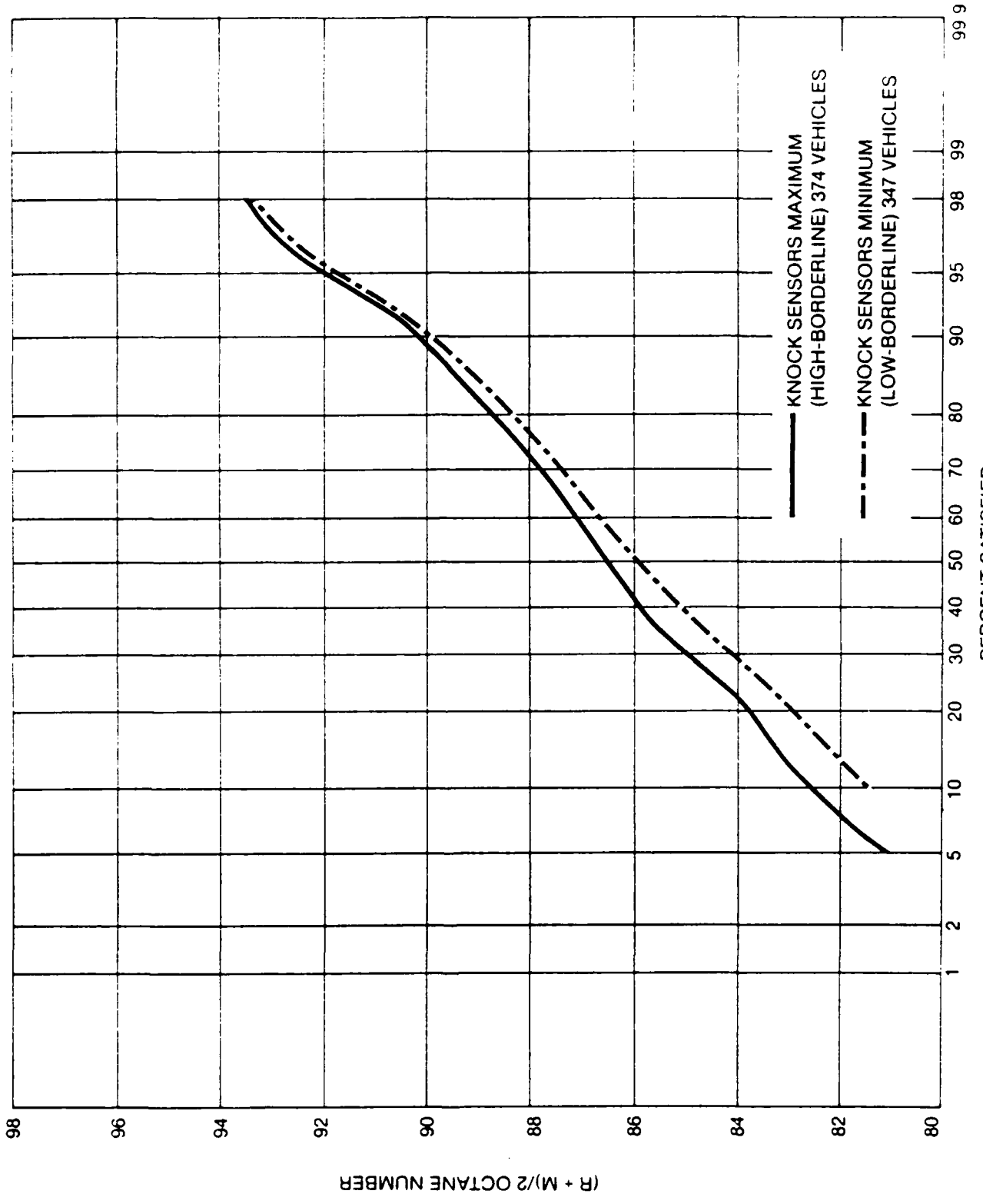


FIGURE 4

DISTRIBUTION OF MAXIMUM FBRSU (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 U. S. AND IMPORTED VEHICLES

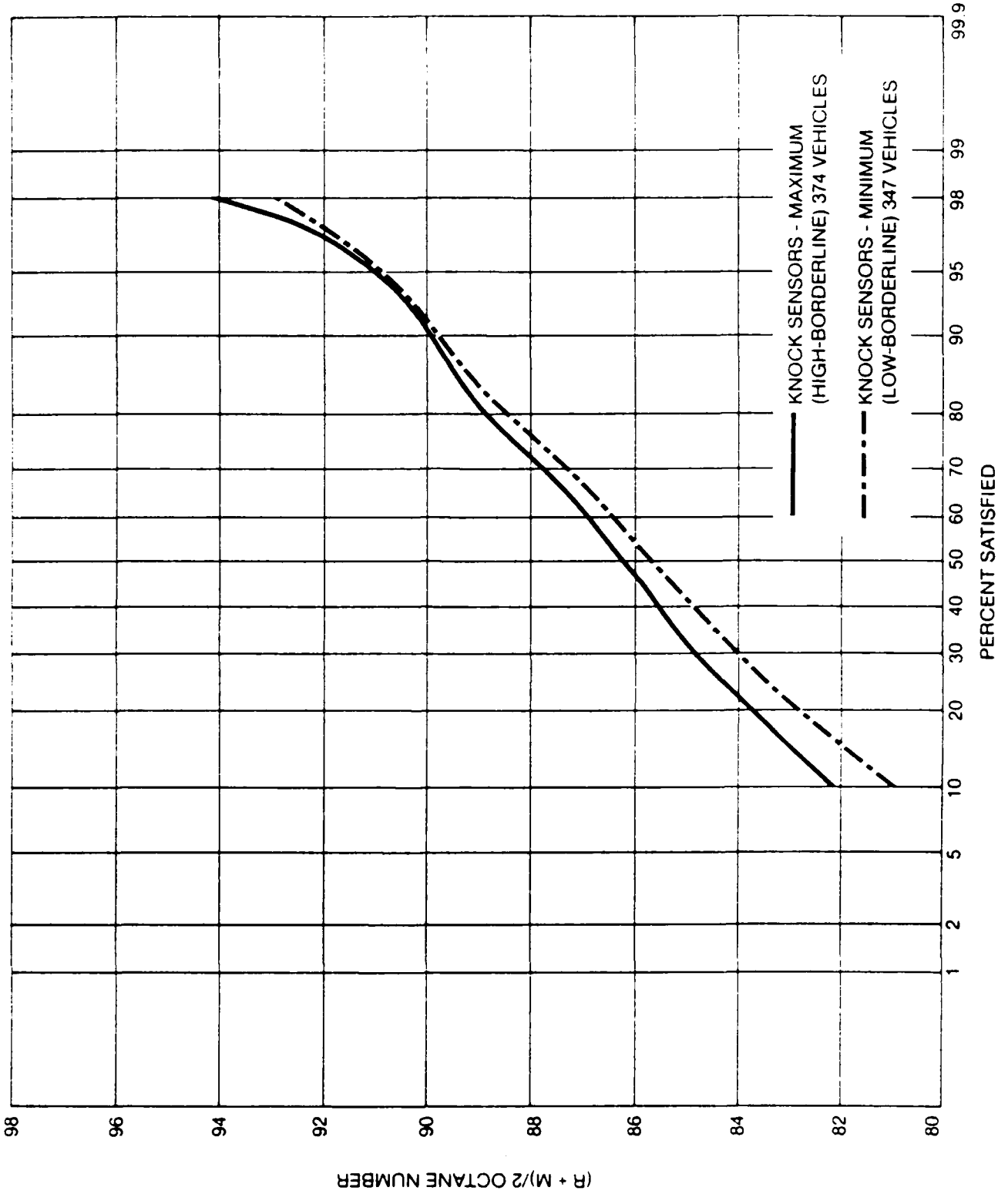


FIGURE 5

DISTRIBUTION OF MAXIMUM (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 U. S. AND IMPORTED VEHICLES

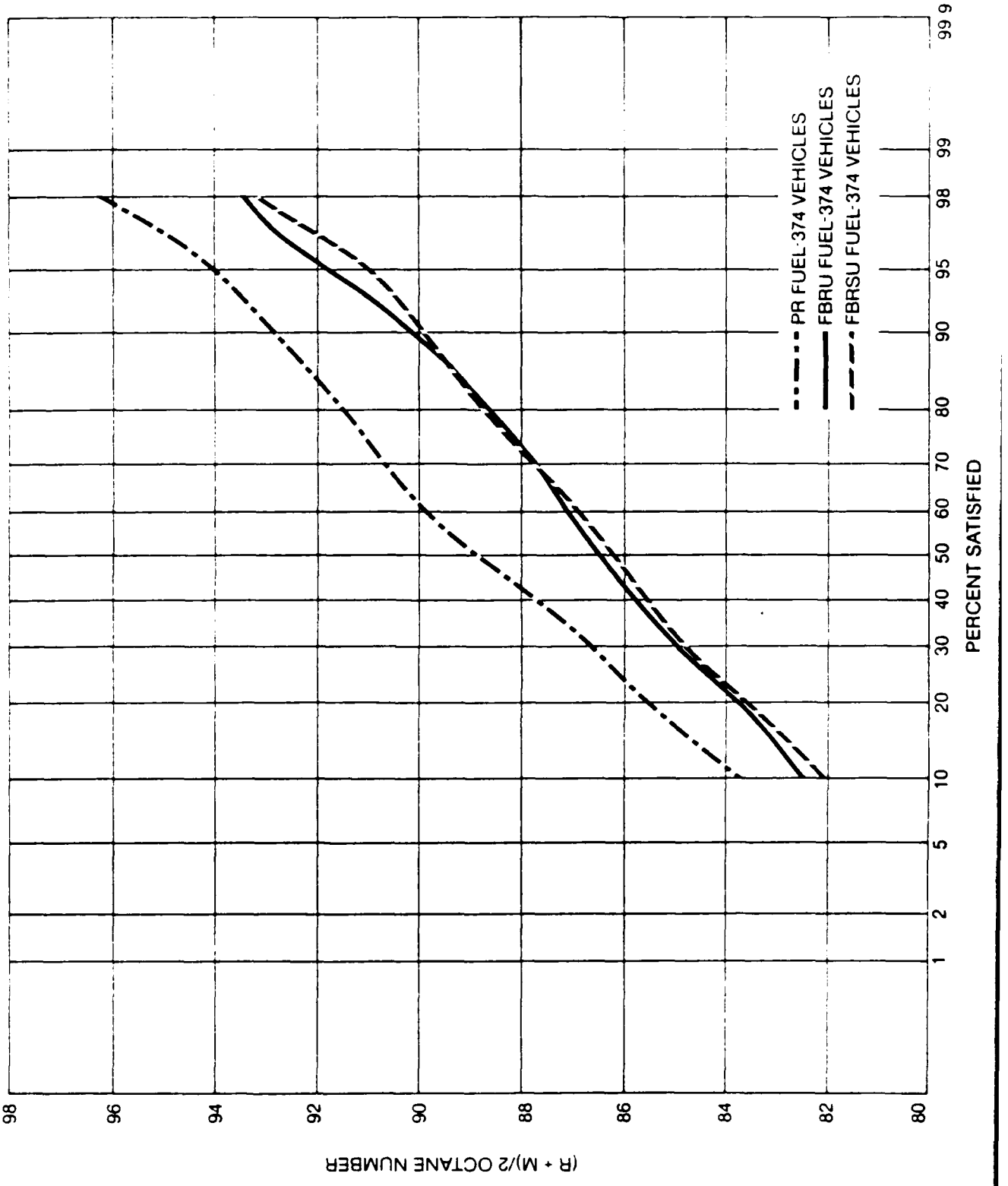


FIGURE 6

COMPARISON OF MAXIMUM FBRU (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 AND 1984 U. S. AND IMPORTED VEHICLES

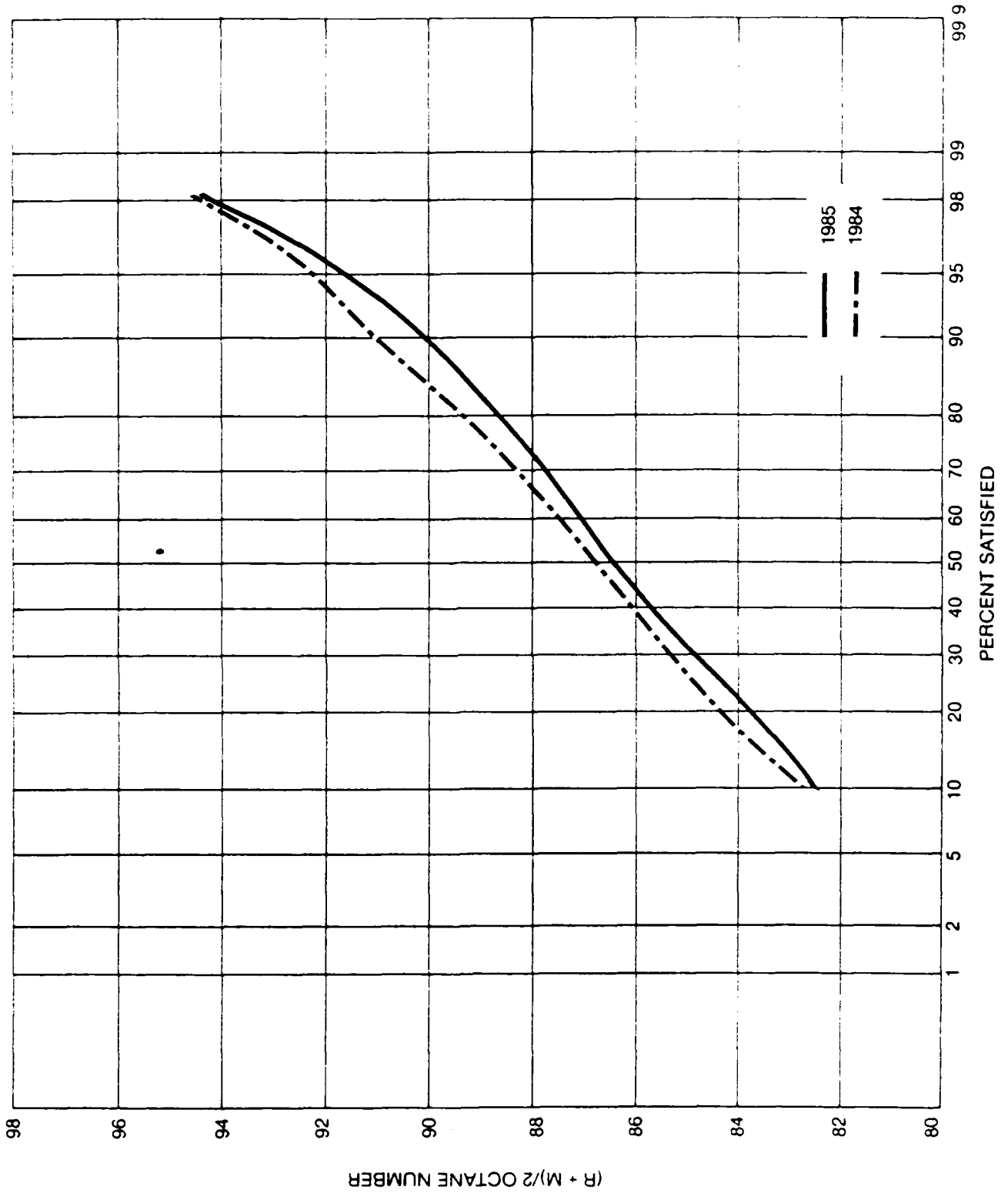


FIGURE 7

DISTRIBUTION OF MAXIMUM (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 U. S. AND IMPORTED CARS

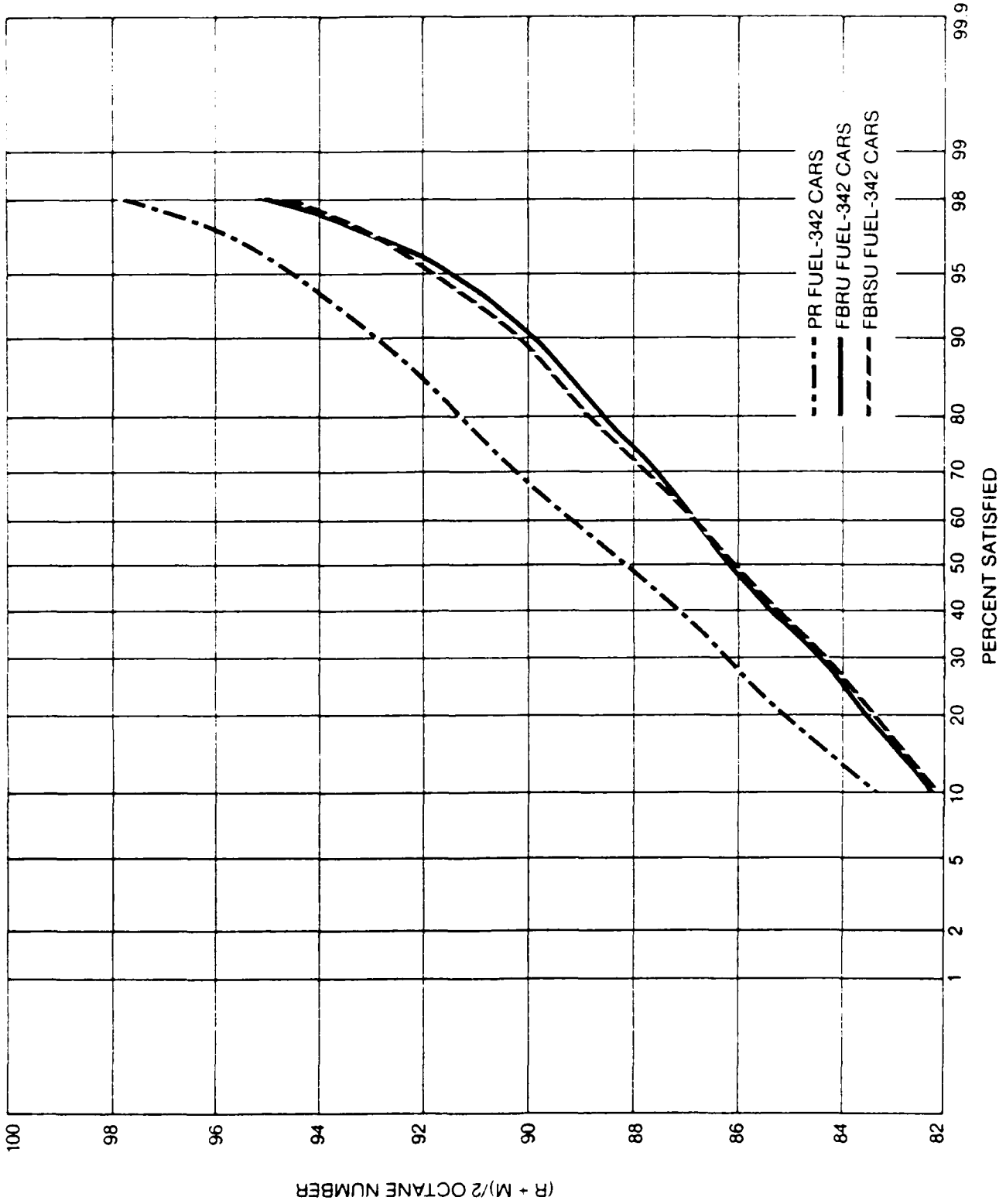


FIGURE 8

DISTRIBUTION OF MAXIMUM (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 U. S. VEHICLES

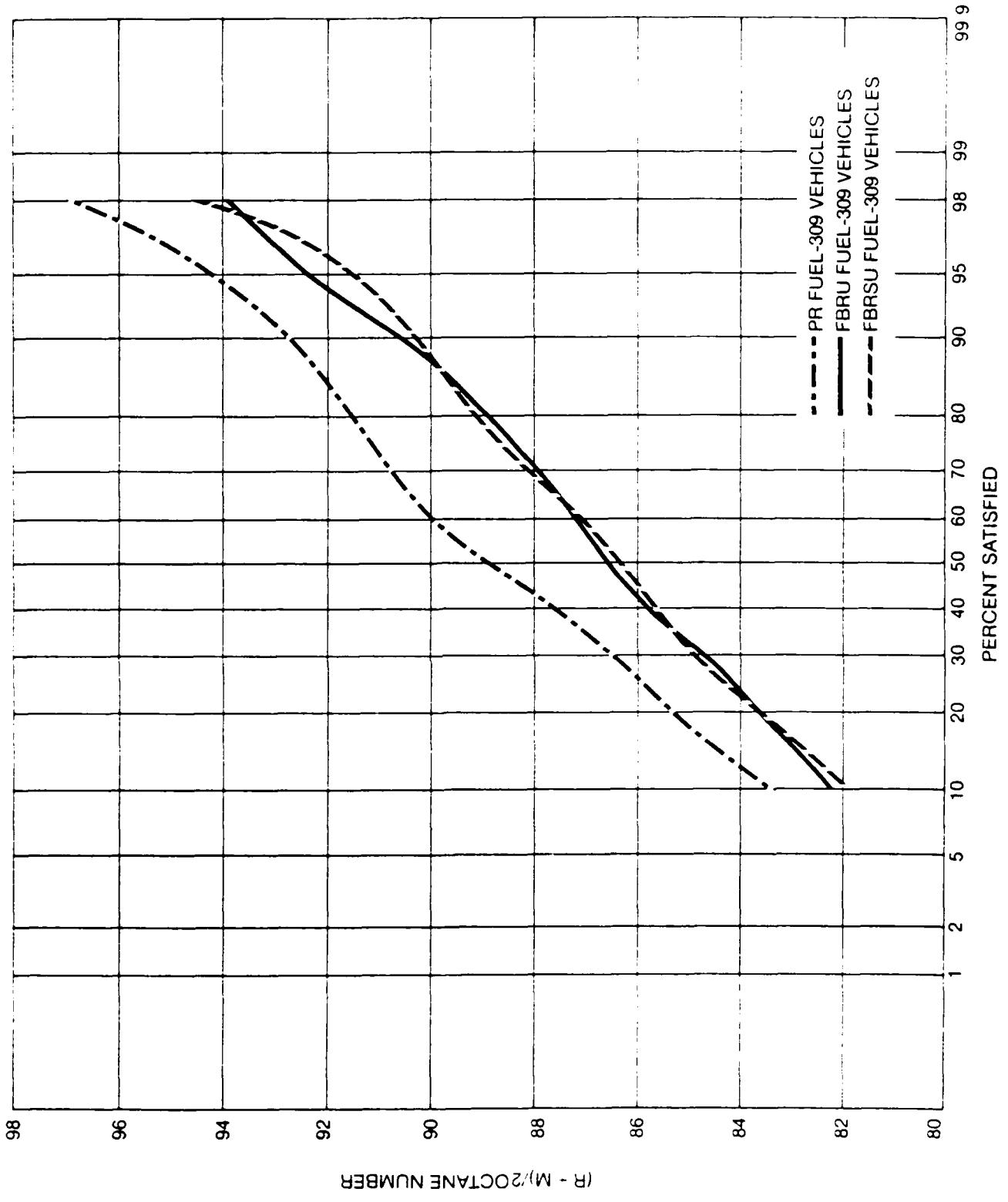


FIGURE 9

DISTRIBUTION OF MAXIMUM (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 U. S. CARS

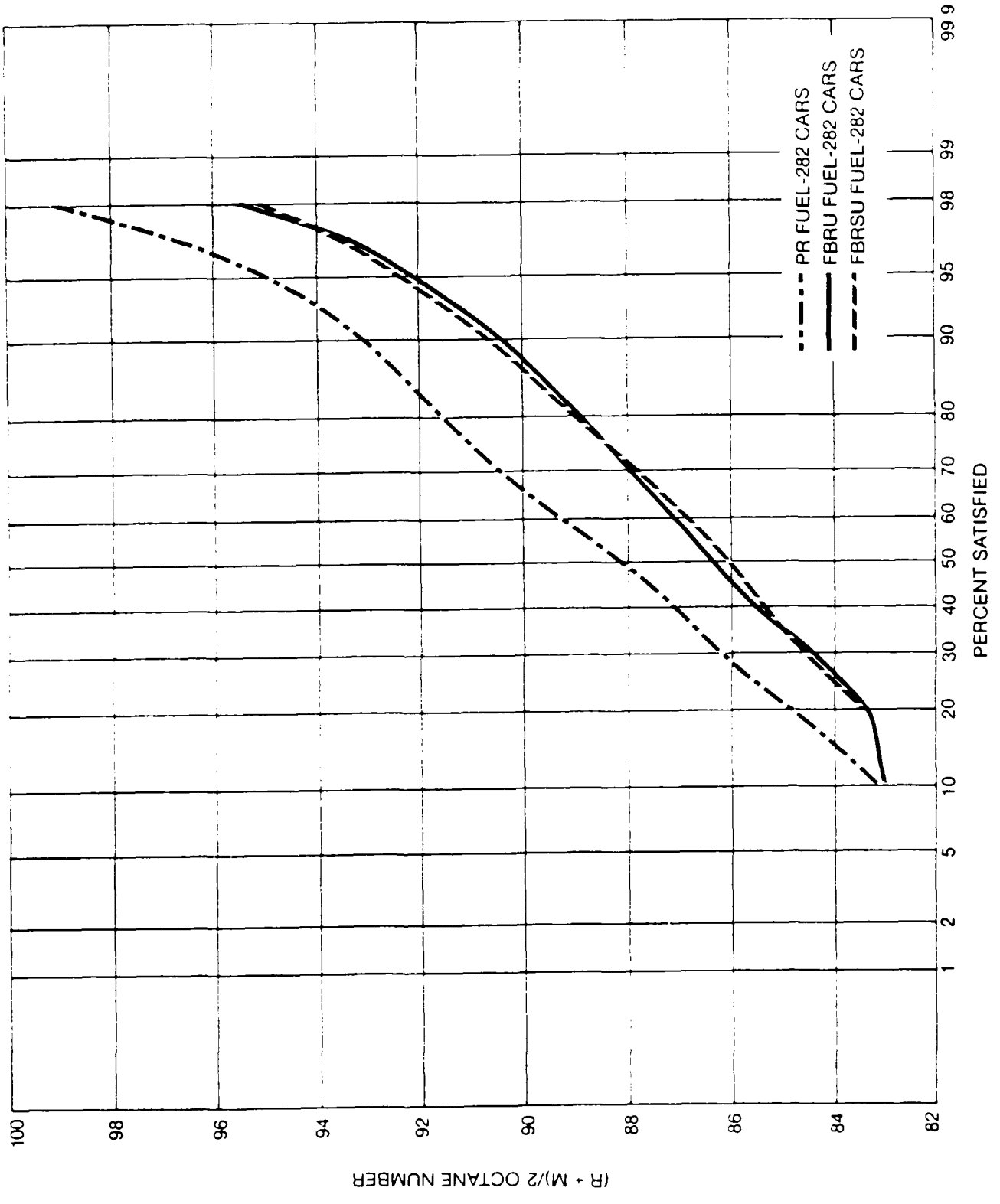


FIGURE 10

DISTRIBUTION OF MAXIMUM (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 IMPORTED VEHICLES

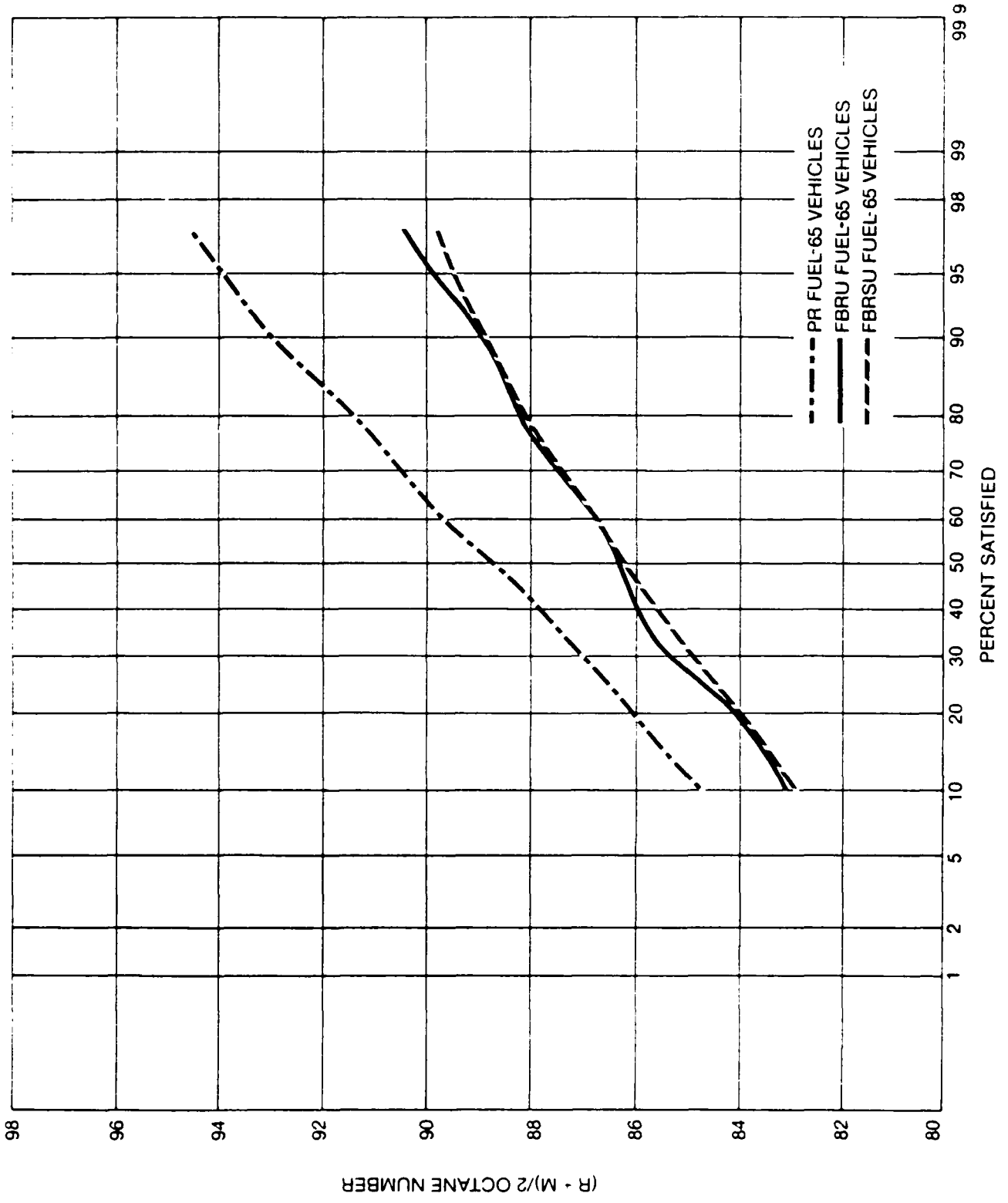


FIGURE 11

DISTRIBUTION OF MAXIMUM (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 U.S. AND IMPORTED KNOCK-SENSOR VEHICLES ONLY
MAXIMUM (HIGH-BORDERLINE)

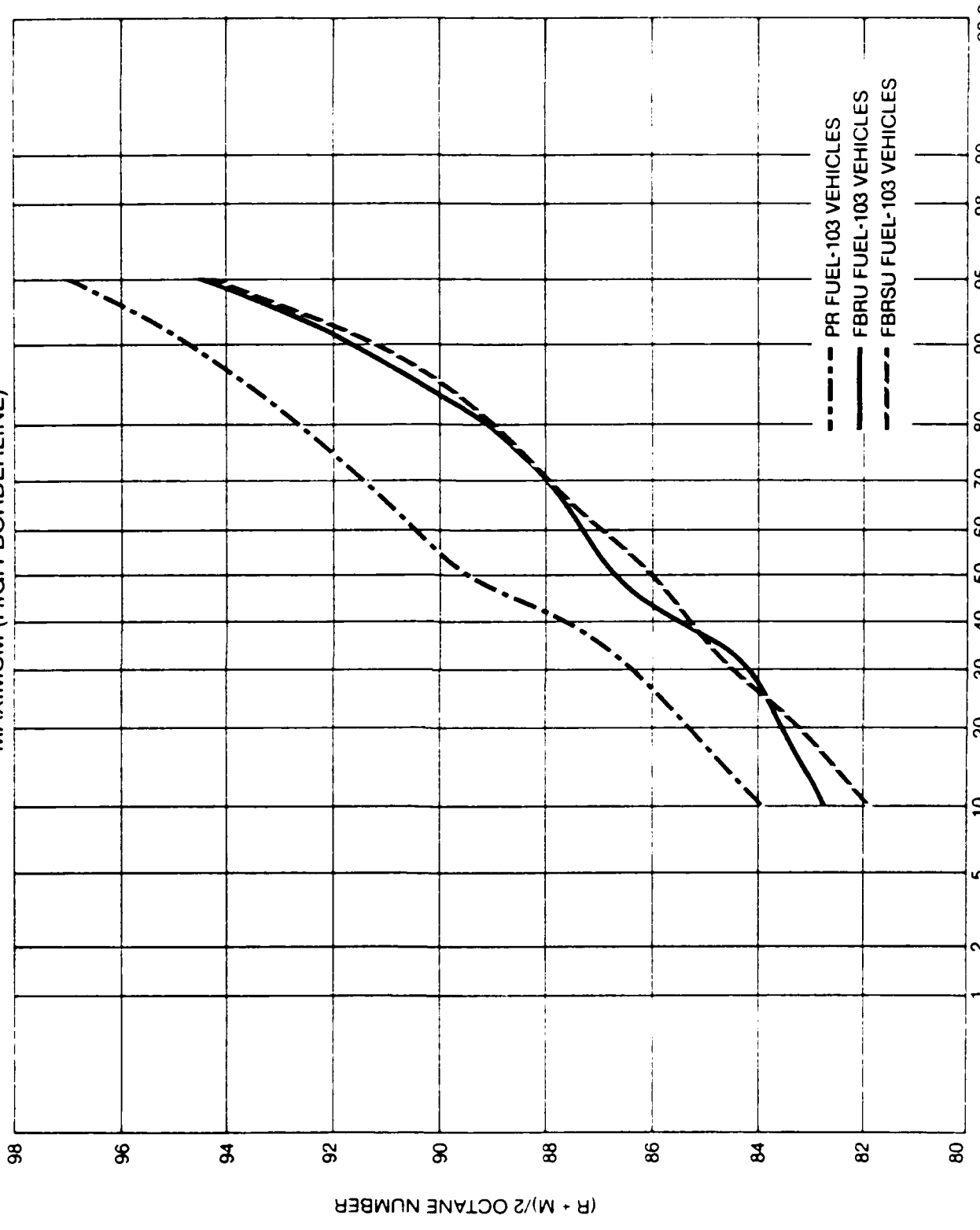


FIGURE 12

DISTRIBUTION OF MAXIMUM (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 U. S. AND IMPORTED KNOCK-SENSOR VEHICLES ONLY
MINIMUM (LOW-BORDERLINE)

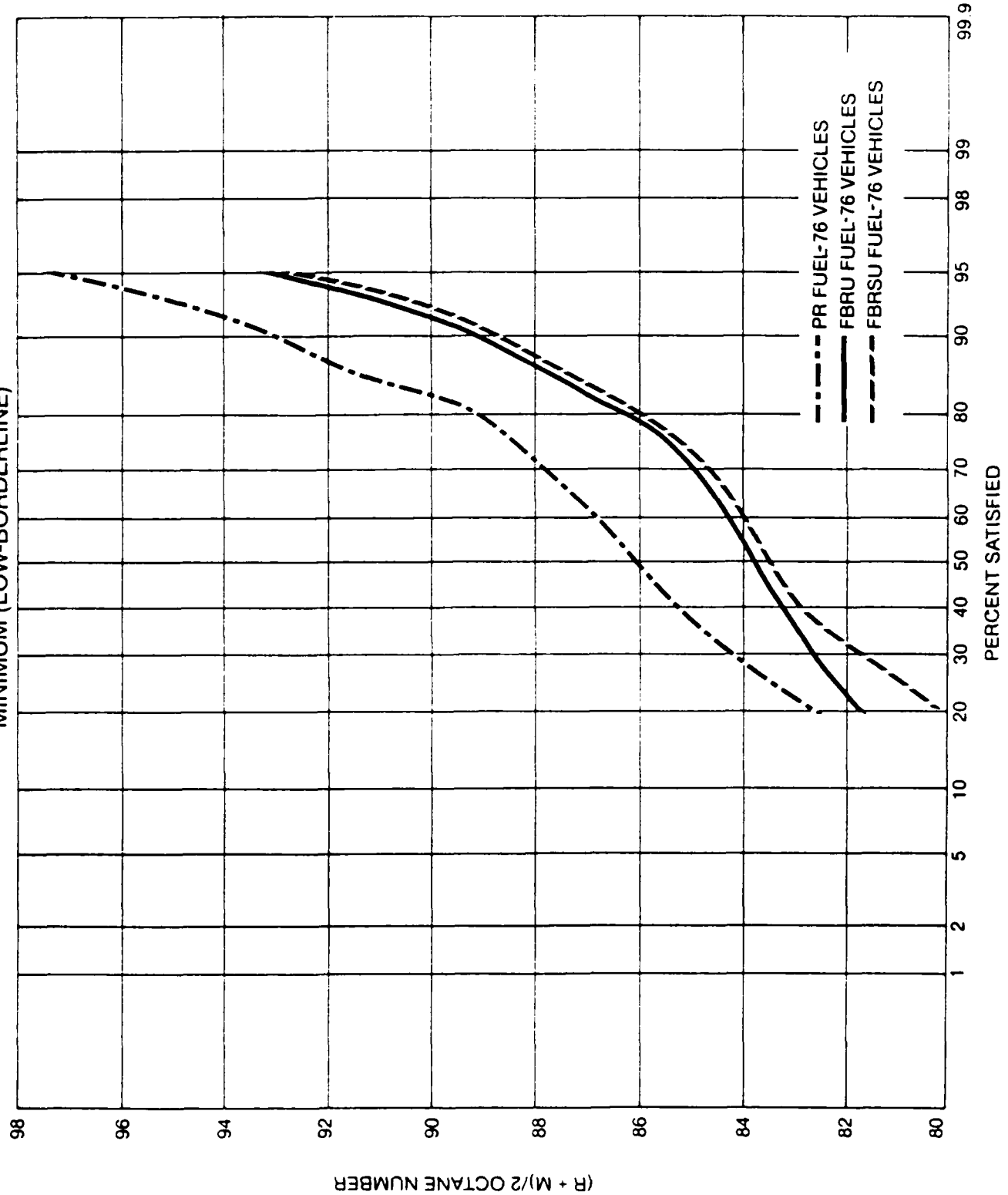
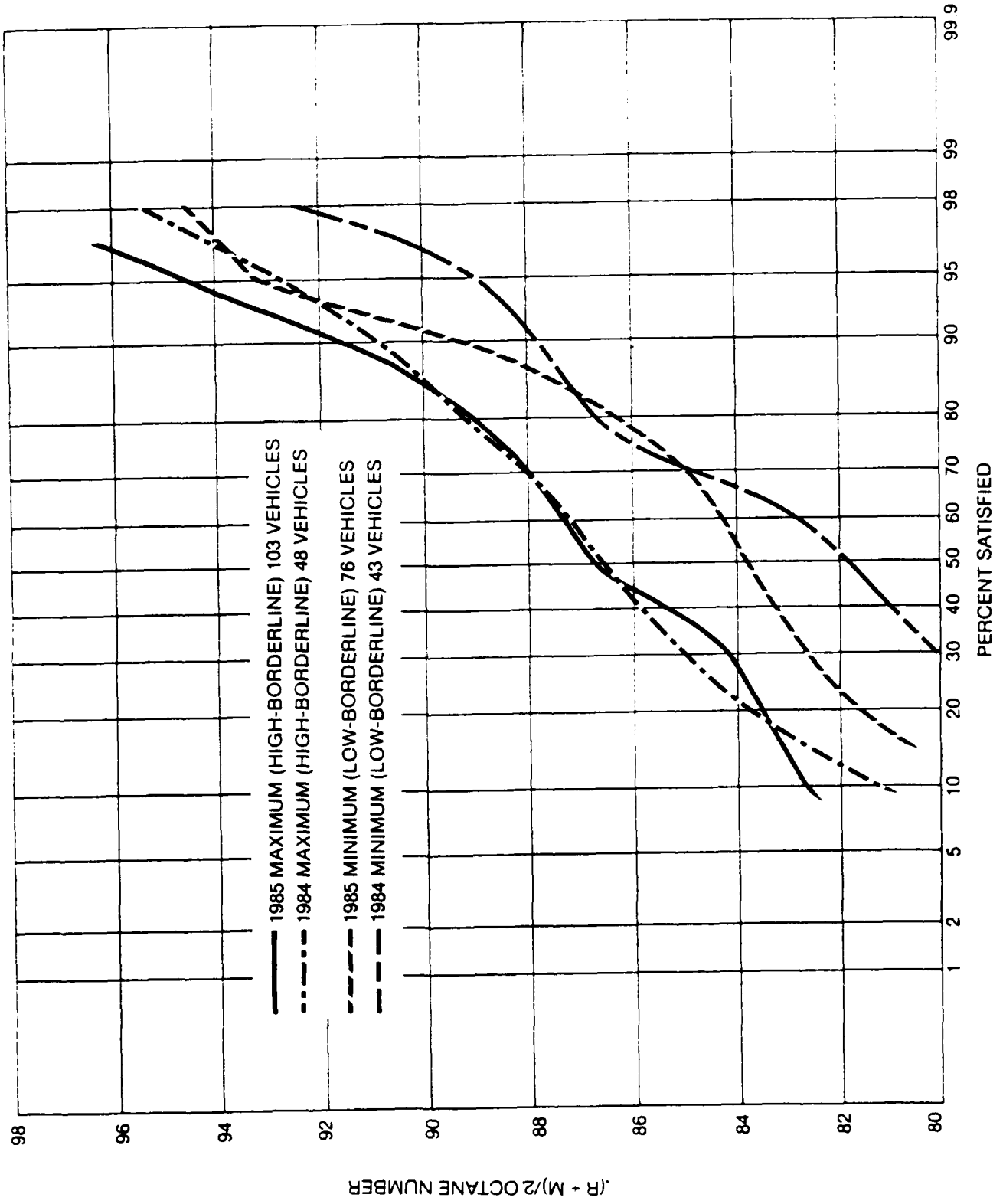


FIGURE 13

COMPARISON OF MAXIMUM FBRU (R + M)/2 OCTANE NUMBER REQUIREMENTS
1985 and 1984 U. S. AND IMPORTED KNOCK-SENSOR VEHICLES ONLY



APPENDIX A

PARTICIPATING LABORATORIES

PARTICIPATING LABORATORIES

No. of Cars Tested	Eastern Area	East Central Area	No. of Cars Tested
30	Exxon Res. & Engrg. Co. Linden, New Jersey	Ford Motor Company Dearborn, Michigan	27
30	Mobil Res. & Dev. Corp. Paulsboro, New Jersey	General Motors Corp. Warren, Michigan	30
32	Sun Company Marcus Hook, Pennsylvania	Nissan Res. & Dev. Ann Arbor, Michigan	10
30	Texaco Inc. Beacon, New York	Shell Canada Oakville, Ontario	8
		Standard Oil Co. (Ohio) Cleveland, Ohio	30
		Toyota Motor Corporation Ann Arbor, Michigan	10
	Western Area	**West Central Area**	
30	Chevron Research Company Richmond, California	Amoco Oil Company Naperville, Illinois	29
32	Unocal Corporation Brea, California	Phillips Petroleum Co. Bartlesville, Oklahoma	21
		Shell Development Co. Houston, Texas	25

A P P E N D I X B

MEMBERSHIP: 1985 ANALYSIS PANEL

1985 CRC OCTANE NUMBER REQUIREMENT SURVEY

1985 ANALYSIS PANEL

J. C. Ingamells, Leader	Chevron Research Company
W. F. Biller	Consultant
R. A. Bouffard	Exxon Research and Engineering Company
P. W. Brigandi	Mobil Research and Development Corp.
J. C. Callison	Amoco Oil Company
E. S. Corner	Consultant
F. A. Hume	Mobil Oil Corporation
T. Wusz	Unocal Corporation

A P P E N D I X C

DATA ON 1985
FULL-BOILING RANGE REFERENCE FUELS

TABLE C-I

SUPPLIERS' FUEL INSPECTIONS

COMPARISON OF 1985 AND 1984 FBRU FUELS

	Low-Octane Base Blend		Intermediate-Octane Base Blend		High-Octane Base Blend	
	RMFD 356-85/86	RMFD 350-84	RMFD 357-85/86	RMFD 351-84	RMFD 358-85/86	RMFD 352-84
Laboratory Inspection						
Distillation, °F						
IBP	91	91	93	99	94	99
10% Evap.	120	131	124	135	126	126
30% Evap.	153	167	154	184	186	188
50% Evap.	195	208	198	229	238	244
70% Evap.	230	251	251	274	255	265
90% Evap.	313	345	337	335	291	295
End Point	388	416	399	404	377	361
Gravity, °API	67.0	66.1	62.8	60.5	52.3	51.4
RVP, psi	8.6	7.8	7.6	7.2	8.1	8.0
Lead, g/gal.	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Oxidation Stab., hr.	>24	>24	>24	>24	>24	>24
Hydrocarbon Type, Vol. %						
Aromatics	22	23	27	32	55	55
Olefins	5	9	10	5	1	1
Saturates	73	68	63	63	44	44
Research Octane Number	76.6	77.6	90.3	90.0	103.5	104.0
Motor Octane Number	72.7	73.7	82.0	80.8	92.3	93.3
Sensitivity	3.8	3.9	8.3	7.2	11.2	10.7

TABLE C-II

OCTANE NUMBERS AND COMPOSITIONS FOR 1985 FBRU FUELS

AND COMPARISON WITH 1984 DATA

	Blending Data Composition, Volume Percent				Sensitivities		
RON	RMFD 356-85/86	RMFD 357-85/86	RMFD 358-85/86	MON	1985	1984	Δ
78	92	8	--	73.8	4.2	4.2	0.0
80	78	22	--	75.4	4.6	4.7	-0.1
82	64	36	--	76.9	5.1	5.1	0.0
84	49	51	--	78.4	5.6	5.7	-0.1
85	42	58	--	79.0	6.0	6.0	0.0
86	34	66	--	79.6	6.4	6.3	0.1
87	26	74	--	80.3	6.7	6.4	0.3
88	18	82	--	80.8	7.2	6.7	0.5
89	11	89	--	81.3	7.7	7.0	0.7
90	3	97	--	81.9	8.1	7.4	0.7
91	--	95	5	82.5	8.5	7.7	0.8
92	--	88	12	83.0	9.0	8.1	0.9
93	--	81	19	83.6	9.4	8.4	1.0
94	--	73	27	84.3	9.7	8.9	0.8
95	--	65	35	85.1	9.9	9.2	0.7
96	--	57	43	85.7	10.3	9.5	0.8
97	--	49	51	86.5	10.5	9.9	0.6
98	--	41	59	87.2	10.8	10.2	0.6
99	--	33	67	88.1	10.9	10.3	0.6
100	--	24	76	89.0	11.0	10.5	0.5
101	--	16	84	89.9	11.1	10.6	0.5
102	--	9	91	90.8	11.2	10.6	0.6
103	--	0	100	92.2	10.8	10.4	0.4

TABLE C-III

SUPPLIERS' FUEL INSPECTIONS

COMPARISON OF 1985 AND 1984 FBRSU FUELS

	Low-Octane Base Blend		Intermediate-Octane Base Blend		High-Octane Base Blend	
	RMFD 359-85/86	RMFD 353-84	RMFD 360-85/86	RMFD 354-84	RMFD 361-85/86	RMFD 355-84
Laboratory Inspection						
Distillation, °F						
IBP	92	103	92	101	92	99
10% Evap.	127	133	126	124	126	130
30% Evap.	173	176	169	163	179	189
50% Evap.	207	212	229	220	231	240
70% Evap.	246	250	283	281	253	261
90% Evap.	345	344	352	353	298	295
End Point	400	414	414	414	424	365
Gravity, °API	63.3	61.9	57.5	59.6	45.8	46.9
RVP, psi	8.4	7.4	7.5	9.0	7.9	8.5
Lead, g/gal.	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Oxidation Stab., hr.	>24	>24	>24	>24	>24	>24
Hydrocarbon Type, Vol. %						
Aromatics	37	23	44	32	62	61
Olefins	7	20	13	8	2	1
Saturates	56	57	43	60	36	38
Research Octane Number	77.3	77.5	90.8	90.1	103.8	103.8
Motor Octane Number	71.5	71.8	80.5	80.8	90.3	90.6
Sensitivity	5.7	5.7	10.3	9.3	13.5	13.2

TABLE C-IV

OCTANE NUMBERS AND COMPOSITIONS FOR 1985 FBRSU FUELS

AND COMPARISON WITH 1984 DATA

	Blending Data Composition, Volume Percent				Sensitivities		
RON	RMFD 359-85/86	RMFD 360-85/86	RMFD 361-85/86	MON	1985	1984	Δ
78	97	3	--	71.5	6.5	6.1	0.4
80	84	16	--	73.3	6.7	6.2	0.5
82	70	30	--	74.6	7.4	6.8	0.6
84	54	46	--	76.1	7.9	7.6	0.3
85	47	53	--	76.8	8.2	7.7	0.5
86	39	61	--	77.5	8.5	8.0	0.5
87	32	68	--	78.0	9.0	8.3	0.7
88	24	76	--	78.6	9.4	8.6	0.8
89	16	84	--	79.2	9.8	9.0	0.8
90	7	93	--	79.8	10.2	9.4	0.8
91	--	99	1	80.3	10.7	9.7	1.0
92	--	92	8	80.9	11.1	10.0	1.1
93	--	85	15	81.6	11.4	10.4	1.0
94	--	78	22	82.3	11.7	10.8	0.9
95	--	71	29	83.0	12.0	11.1	0.9
96	--	63	37	83.8	12.2	11.4	0.8
97	--	54	46	84.7	12.3	11.8	0.5
98	--	46	54	85.5	12.5	12.1	0.4
99	--	38	62	86.2	12.8	12.3	0.5
100	--	29	71	87.0	13.0	12.7	0.3
101	--	20	80	87.9	13.1	12.8	0.3
102	--	11	89	88.9	13.1	12.8	0.3
103	--	1	99	90.0	13.0	12.8	0.2

APPENDIX D

PROGRAM

COORDINATING RESEARCH COUNCIL
INCORPORATED
219 PERIMETER CENTER PARKWAY
ATLANTA, GEORGIA 30346
(404) 396-3400

SUSTAINING MEMBERS
American Petroleum Institute
Society of Automotive Engineers, Inc.

PROGRAM

for the

1985 CRC OCTANE NUMBER REQUIREMENT SURVEY

CRC Project No. CM-123-85

March 1985

TABLE OF CONTENTS

I. INTRODUCTION

The 1985 program of the CRC Light-Duty Octane Number Requirement Survey Group will consist of a survey of the octane number requirements of 1985 model domestic and imported vehicles. For the purposes of this program, the designation "passenger vehicles" will include passenger cars, light-duty (<8500 lb/3856 kg GVW) pickup trucks, and vans. Approximately 400 vehicles will be tested. Most of these vehicles will be sampled in proportion to their relative production or import volume, to provide data from which to estimate the distribution of octane number requirements for the 1985 model vehicle population in the United States. In addition, select models of special interest will be tested in sufficient numbers to estimate their requirement distributions.

Knocking characteristics will be investigated with three series of reference fuels. Tank fuel knock will also be evaluated. Maximum octane number requirements, whether at maximum-throttle or part-throttle, will be established for each vehicle using high sensitivity unleaded full-boiling range reference (FBRSU) fuels, average sensitivity unleaded full-boiling range reference (FBRU) fuels, and primary reference (PR) fuels. If the maximum requirement is at maximum-throttle, then part-throttle requirements are investigated with only FBRU fuels of up to, and including, four octane numbers lower than the maximum requirement. Minimum requirements are determined for knock sensor-equipped vehicles.

Octane requirements throughout the speed range will be obtained with PR fuels only.

II. GEOGRAPHICAL AREAS

As in previous years, the 1985 Survey will be conducted on a nationwide basis. The country has been divided into four geographical areas. Participants located in New York, New Jersey, Delaware, and Pennsylvania have been included in the Eastern Area; those located in Ohio, Michigan, and Kentucky comprise the East Central Area; those in Illinois, Texas, and Oklahoma comprise the West Central Area; and California participants make up the Western Area. A coordinator has been appointed for each area as follows:

Eastern Area.....R. A. Bouffard
East Central Area.....D. P. Barnard
West Central Area.....J. B. Baker
Western Area.....T. Wusz

The area coordinators will contact their area participants periodically regarding the progress of the survey. To expedite this, it is suggested that participants send copies of all correspondence concerning the survey to the area coordinators. This program outlines the survey in broad terms. If more detailed information is desired, it is suggested that the participant contact his area coordinator.

III. VEHICLES

A total of approximately 400 vehicles will be tested in the 1985 Survey. Current experience indicates we can expect 11 full participants and 5 partial participants. By assigning 30 cars per full participant and 70 cars for the partial participants, the 400-car total is obtained. These will be divided into two groups: (1) the statistical group, sampled in proportion to US car model production or import volume, and (2) select models of special interest. Approximately 20 of each of these select models will be tested to provide an estimate of the octane requirement distribution of each model. Some of these 20 vehicles will be those already included in the statistical group, and the remainder will be additional vehicles added to the program.

The desired number of vehicles to be tested in each category is as follows:

Statistical Group	350
Additional Select Model Group	50
Total	400

A detailed breakdown of the specific models and the number of each model to be tested will be circulated to the participants in May 1985 after an estimate of vehicle model production has been obtained. Design specifications for select models to be tested in the 1985 Survey are shown in Table I. Selection of these vehicles has been based on new or modified design characteristics that might have a significant effect on octane number requirements and high sales volume which allows individual treatment without additional testing.

Wherever possible, specific vehicle assignments to individual participating laboratories will be made in a pattern which tends to minimize data bias. This will be accomplished by apportioning cars of a given model among the four geographical areas, and subsequently among the laboratories within each area, in order to minimize the effect of nonrandom factors on the results of the Survey. Cars tested under contract will be assigned to the region where the contracting laboratory is located.

IV. FUELS

A. Full-Boiling Range Reference Fuels

Two full-boiling range reference fuel series will be used to define the vehicle octane number requirements. The two series will be unleaded and of varying sensitivity. One series will be comparable to the average sensitivity of unleaded commercial fuels (FBRU); the other series (FBRSU) will be a minimum of two numbers higher in sensitivity than the FBRU fuels. The Research octane number (RON) range for both fuel series is 77 to 104.

The two series will be blended in increments of two RON up to 84, and one RON above 84 from three base fuels for each series. The base fuels are compounded from normal refinery gasoline components. Limiting specifications for each base fuel for both series are shown in Table II. These specifications will apply to both the 1985 and 1986 Surveys.

Research and Motor ratings will be determined for incremental blends of each fuel series by all participants to provide data for establishment of blending curves. The average ratings and blending curves will be circulated to all participants.

B. Primary Reference Fuels

Blends of ASTM-grade isooctane and normal heptane will be prepared in two octane number increments from 76 to 82, and one octane number increments from 82 to 100.

C. Tank Gasoline

Research and Motor octane ratings will be obtained only on gasoline samples from the tank of vehicles with owner questionnaire (Attachment 1). Owner's Questionnaire should be obtained only if:

a) vehicle has a regular driver;

b) the ignition timing is within $\pm$ 2° of the manufacturer's specifications.

V. TEST TECHNIQUE

All tests are to be conducted using the technique entitled, "Technique for Determination of Octane Number Requirements of Light-Duty Vehicles" (CRC Designation E-15-85). A copy of this technique is included as Attachment 2 to this program. Octane number requirement investigations are to be conducted in all vehicles under level road conditions. Any vehicle obviously in poor mechanical condition or with malfunctioning emission control devices should not be considered for test work. The vehicles must have a minimum of 6000 deposit miles (9656 km), and preferably be privately owned and operated. Vehicles previously used for fuel road octane rating must not be employed in this survey.

Data should be reported on each vehicle tested, even though knock was not encountered on any of the fuels.

The order in which the fuels are to be tested is as follows:

1) Tank fuel;
2) FBRSU;
3) FBRU;
4) PR.

VI. DATA FORMS

The test results on each vehicle will be reported on data forms DFMF-11-1185, DFMF-12-1185, and DFMF-19-1185. For knock sensor-equipped vehicles, data forms should be filled out completely for maximum and minimum requirements. Copies of these forms will be mailed to all participants from the CRC office with instructions for their use. Additional instructions are included in the E-15-85 technique.

VII. REPORTING RESULTS

The original data forms for each vehicle tested should be submitted to the CRC Consultant, Dr. E. S. Corner, RD 2, Ridge Road, Lebanon, New Jersey 08833; and a copy of the letter of transmittal to the Coordinating Research Council, Inc., 219 Perimeter Center Parkway, Atlanta, Georgia 30346, as soon as possible, but not later than October 31, 1985.

TABLE D-I

DESIGN SPECIFICATIONS FOR 1985 SELECT MODELS

Make & Model	Engine Displ. Litres	Configuration & No. of Cylinders	Carb. Bbls.	Comp. Ratio	BHP	VIN Engine Code	Transmission Type
Plymouth Reliant Dodge Aries, Daytona & Lancer Chrysler Laser & GTS	2.2	L4	TBI	9.0	99	D	Automatic
Plymouth Voyager Dodge Caravan	2.2	L4	2V	9.0	101	C	Automatic
Ford Tempo Mercury Topaz	2.3	L4	TBI	9.0	-	X	Automatic
Ford Crown Victoria Mercury Grand Marquis	5.0	V8	TBI	8.4	140	F	Automatic (AOD)
Pontiac Grand Am Oldsmobile Calais Buick Somerset Regal	3.0	V6	MFI	9.0	125	L	Automatic
Chevrolet Cavalier Pontiac J2000 Oldmobile Firenza Buick Skyhawk Cadillac Cimarron	2.8 HO	V6	MFI	8.9	130	W	Automatic
Chevrolet Caprice Pontiac Parisienne	4.3	V6	TBI	9.3	135	Z	Automatic (AOD)

TABLE D-II

LIMITING SPECIFICATIONS FOR 1985 AND 1986 FULL-BOILING RANGE REFERENCE FUELS*

Inspection Tests	Unleaded Average Sensitivity Reference Fuels (FBRU)			Unleaded High Sensitivity Reference Fuels (FBRSU)		
	RMFD 356		RMFD 357	RMFD 358	RMFD 359	RMFD 360	RMFD 361
ASTM Distillation, °F(°C)							
IBP, Min.	90	(32.2)	90	90	90	90	90
10% Evap.	115-158	(46.1- 70.0)	115-158	115-158	115-158	115-158	115-158
30% Evap.	150-190	(65.6- 87.8)	150-190	150-190	150-190	150-190	150-190
50% Evap.	195-250	(90.6-121.1)	195-250	195-250	195-250	195-250	195-250
70% Evap.	230-300	(110.0-148.9)	230-300	230-300	230-300	230-300	230-300
90% Evap.	285-374	(140.6-190.0)	285-374	285-374	285-374	285-374	285-374
End Point, Max.	437	(225)	437	437	437	437	437
RVP, psi (KPa)	7-9	(48-62)	7-9	7-9	7-9	7-9	7-9
Lead, g/gal (g/l)	<0.03	(<0.008)	<0.03	<0.03	<0.03	<0.03	<0.03
Oxidation Stability, Minutes, Min.	1440		1440	1440	1440	1440	1440
Hydrocarbon Type, Vol. %							
Aromatics, Max.**	20		35	55	35	45	65
Olefins, Max.	20		15	10	35	25	15
Saturates	Remainder		Remainder	Remainder	Remainder	Remainder	Remainder
Octane Number							
Research	77 ± 1		90 ± 1	104 ± 1	77 ± 1	90 ± 1	104 ± 1
Sensitivity***	4.0 ± .5		8.2 ± .5	11.5 ± .5	6.0 ± .5	10.2 ± .5	13.5 ± .5
Minimum of two units sensitivity difference between corresponding fuels of each series.							
Color	Clear		Green	Red	Yellow	Deep Purple	Light Blue

Note: All fuels to contain minimum 5 PTB of a 100% active antioxidant and 10 PTB of corrosion inhibitor. No manganese added.
Confirmation of product quality of fuel blends to be approved by a six-laboratory CRC Fuel Acceptance Panel prior to drumming.

* To be compounded from normal refinery components. Oxygenates are not to be used as fuel components.
** 1% maximum Benzene or legal.
*** Sensitivities are shown for the mean Research octane number.

CRC OCTANE NUMBER REQUIREMENT SURVEY

OWNER'S QUESTIONNAIRE

OWNER:

Your vehicle is being tested for fuel octane number requirements by a Coordinating Research Council activity. To help analyze the data, we would like the person who has recently been driving the vehicle to answer the following questions:

1. What grade of unleaded fuel do you normally use?

_____ Regular _____ Premium _____ Mixture

2. Has any engine knock (ping) been encountered with the fuel that is now in the tank?

_____ Yes _____ No

3. Did you consider the knock (ping) objectionable?

_____ Yes _____ No

Vehicle Make _____ License No. _____

Vehicle Identification No. _____

TECHNIQUE FOR DETERMINATION OF OCTANE NUMBER REQUIREMENTS OF LIGHT-DUTY VEHICLES

(CRC Designation E-15-85)

September 1984

TECHNIQUE FOR DETERMINATION OF OCTANE NUMBER REQUIREMENTS OF LIGHT-DUTY VEHICLES

(CRC Designation E-15-85 - Including Annex A)

A. GENERAL

The technique provides for the determination of maximum octane number requirements (and minimum octane number requirements for vehicles equipped with knock sensors), whether at maximum-throttle or part-throttle, of a vehicle in terms of borderline spark knock on two series of full-boiling range reference fuels as well as on primary reference fuels. If the maximum requirement is at maximum-throttle, then part-throttle requirements are investigated with only FBRU fuels of up to, and including, four octane numbers lower than the maximum requirement. It also provides octane requirements throughout the speed range on primary reference fuels.

Spark knock of tank fuel will also be determined.

B. DEFINITION OF TERMS

The following definitions of knock, approved by the CLR and CFR Committees on June 8, 1954, have been rephrased for clarification and adaptability to current technology by the Survey Steering Panel.

1. Spark Knock:

Spark knock is the noise associated with autoignition* of a portion of the fuel-air mixture ahead of the advancing flame front. It is recurrent and repeatable in terms of audibility and fuel octane quality.

2. Knock Intensity

a. Borderline Knock

This means spark knock of lowest audible intensity of at least three (3) pings, and over a range of engine speed of at least 50 rpm, all being repeatable during subsequent accelerations.

---

* Autoignition: The spontaneous ignition and the resulting very rapid reaction of a portion or all of the fuel-air mixture. The flame speed is many, many times greater than that which follows normal spark ignition. There is no time reference for autoignition.

b. No Knock

This means either no audible knock or less than borderline knock.

c. Above Borderline Knock

This means spark knock of greater than borderline intensity.

3. Octane Number Requirements

a. Maximum Requirement

This is equivalent to the octane number of the highest reference fuel giving borderline knock as previously defined (the next highest fuel gives no knock). If the knock intensity with the highest fuel giving knock is above borderline, the maximum requirement shall be equivalent to the mid-point between the octane number of the fuel giving knock and that of the next highest fuel which gives no knock.

b. Minimum Requirement (for vehicles with knock sensors)

This is equivalent to the octane number of the lowest reference fuel giving borderline knock (the next lower fuel will give above borderline knock).

4. Definition of Accelerations

Accelerations are made at maximum-throttle and part-throttle conditions which are defined below:

a. Maximum-Throttle

The throttle is depressed and held at either full-throttle or the widest throttle position that does not cause the transmission to downshift (detent) throughout the acceleration in each of the required test gears listed in D.3.d.(1)(a). The detent manifold vacuum/pressure obtainable on a given model is determined by the transmission characteristics. For manual transmissions, the throttle is depressed fully throughout the acceleration.

b. Part-Throttle

The throttle is depressed and regulated throughout the acceleration to maintain a desired, constant critical manifold vacuum as defined in D.3.d.(1)(d).

C. VEHICLE PREPARATION

The following vehicle preparation steps should be completed before any octane tests are run. Detailed procedures for each adjustment can be found in the manufacturers' shop manuals.

1. Record vehicle identification number and emission control type, Federal, Altitude, or California. Fill in heading on data sheet DFMF-11-1185. For knock sensor-equipped vehicles, two DFMF-11-1185 data sheets should be filled out completely: one for maximum requirement, and one for minimum requirement. Ford emission calibration numbers are to be recorded.

2. Inspect all vacuum lines and air pump hoses for appropriate connections. Also, check to see if PCV valve, spark advance vacuum delay controls, EGR valve, knock sensors, and heated inlet air mechanism are functioning. Engine must be warmed up for these checks.

3. Record engine idle speed and observe anti-dieseling solenoid operation. Adjust to manufacturers' recommended specifications as specified on the under-hood decal.

4. Observe and record basic spark timing at recommended engine speed. Adjust to manufacturers' recommended setting as specified on the under-hood decal.

5. Crankcase oil, radiator coolant, automatic transmission fluid, and battery fluid levels shall be maintained as recommended by the manufacturer.

6. A calibrated tachometer graduated in 100 rpm (or smaller) increments and capable of indicating engine speed from 0-5000 rpm shall be installed on each vehicle.

7. One calibrated vacuum gage, graduated in one-half inch of mercury (or smaller) increments and capable of indicating vacuum from 0-24 inches of mercury (0-81 kPa) shall be connected to the intake manifold. For vehicles with turbochargers, a compound vacuum/pressure gage should be used; the pressure side of the gage should be capable of indicating pressures up to 15 psi (103 kPa).

8. An auxiliary fuel system shall be provided to supply test fuels to the engine. Caution shall be taken to avoid placing auxiliary fuel lines in locations which promote vapor lock. If vehicles with carbureted engines have tank return fuel lines, this return line should be blocked off. Disconnect fuel tank vent line at evaporation control system canister. Instructions for fuel handling with fuel injection systems are given in the annex to this procedure (page D-27).

9. For vehicles with owner questionnaire completed, a sample of the tank gasoline shall be withdrawn for determination of Research and Motor method octane number ratings. If insufficient fuel is available, omit this step and obtain tank fuel observations as described in Item D.3.d.(2).

D. TEST PROCEDURE

1. Engine Warm-Up

a. To stabilize engine temperatures, a minimum of ten miles of warm-up is required. The test vehicle should be operated at 55 mph (88 kph) in top gear with a minimum of full-throttle operation.

b. During the warm-up period, the general mechanical condition of the vehicle should be checked to insure satisfactory and safe operation during test work.

2. Fuel Changeover

Caution: Because of the installation of catalytic devices on these vehicles, permanent damage may result if the engine runs lean or stalls. Therefore, changeover from one fuel to another must be accomplished without running the carburetor or fuel injection system dry. Fuel handling procedures for vehicles equipped with fuel injection systems are explained in Annex A.

To eliminate contamination of the new fuel with residual amounts of the previous fuel, flush system twice with new fuel.

After fuel changeover, make one maximum-throttle acceleration before beginning Vehicle Rating Procedure.

3. Details of Observations

a. Operating Conditions

All octane number requirements will be determined under level road acceleration conditions.

Tests will be conducted on moderately dry days, preferably at ambient temperatures between 60°F (15.5°C) and 90°F (32.2°C). Tests should not be conducted during periods of high humidity such as prevail when rain is threatening or during or immediately after a rain storm. Laboratories with control capabilities should target for 70°F (21°C) air temperature and 50 grains of water per pound (7.14 gm/kg) of dry air whenever possible.

Air-conditioned vehicles will be tested with air conditioner turned ON. (Normal setting, minimum temperature, low fan.) Air conditioner will be ON at all times.

AD-A175 363 1985 CRC OCTANE NUMBER REQUIREMENT SURVEY(U) 2/2
COORDINATING RESEARCH COUNCIL INC ATLANTA GA OCT 86
CRC-548

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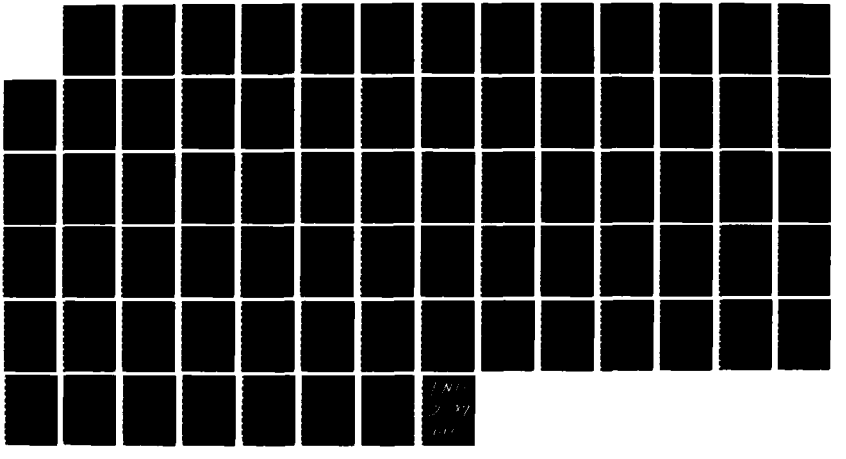

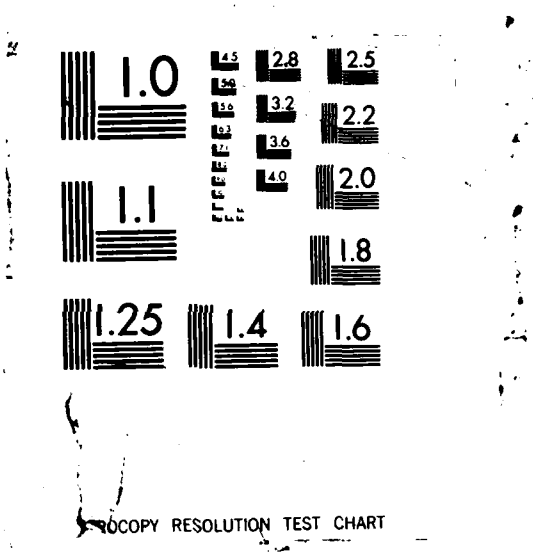
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2.8
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3.6
4.0
4.5
5.0
5.6
6.3
OCOPY RESOLUTION TEST CHART

b. Order of Fuel Testing

1) Tank
2) FBRSU
3) FBRU
4) Primary

c. Determination of Knock Intensity

Maximum octane requirements will be established by evaluating the occurrence of knock in terms of knock intensity: "N" for none, "B" for borderline, and "A" for above borderline. Establishment of representative knock intensity for a given fuel will be accomplished with a maximum of three (3) rated accelerations. Coastdown time between the end of one acceleration and the beginning of the next should be approximately twenty (20) seconds. As defined below, the first two duplicating accelerations are sufficient with "N" and "B" intensity.

Acceleration Number			Representative Rating
1	2	3	
N	N	-	N
N	B	N	N
N	B	B	B
B	N	B	B
B	B	-	B
B	A	-	A
A	-	-	A

All subsequent accelerations will normally be discontinued when "A" knock intensity is experienced, and testing continued with a higher octane number fuel in that series. An exception will be made if "A" knock is experienced on the highest octane fuel which knocks in the engine. In this case, it may be necessary to run additional accelerations to determine the speed of maximum knock intensity. If "A" knock is experienced at initiation of acceleration, as limited by transmission characteristics, this speed will be considered the speed of maximum knock. Otherwise, the midpoint between knock-in and knock-out will be considered the speed of maximum knock. When establishing knock-in and knock-out, back off on the throttle between points to eliminate "A" knock.

Minimum octane number requirements (for vehicles equipped with knock sensors) will be established in a similar manner except that when "A" knock intensity is encountered, subsequent accelerations will be made with a given fuel until duplicate "A" ratings are obtained over a measurable range of engine speeds as indicated below:

Acceleration Number			Representative Rating
1	2	3	
B	A	B	B
B	A	A	A
A	A	-	A
A	B	B	B

d. Determination of Octane Requirements

Tests should be run to 60 mph (97 kph) unless required to terminate at 55 mph (88 kph) because of legal speed limits.

(1) Vehicle Operating Procedure

(a) Establishment of Automatic Transmission Characteristics (for Maximum-Throttle Accelerations)

Obtain the transmission downshift characteristics of engine rpm and manifold vacuum/pressure at 25, 35, 45, and 55 mph (40, 56, 72, and 88 kph) incremental speeds (as obtainable in each gear), by movement of the throttle through the detent, i.e., downshift, throttle position. Also determine the minimum attainable road speed. These characteristics are to be determined for each of the gears specified in the table below. For transmissions with converter clutches, determine the minimum road speed for clutch application. At this initial speed and at 10 mph (16 kph), increments up to about 60 mph (97 kph) determine minimum vacuums (pressures) for application. Record all road speed/engine rpm/vacuum or pressure measurements from above on data sheet.

Do not use brakes, turn signals or hazard flashers during accelerations as these may affect electronic engine controls.

The selection of required test gears, and test gear/converter clutch combinations (if applicable) for various types of transmissions are listed below. Transmissions not explicitly described should be tested in a manner as similar as possible to those listed. Automatic transmission vehicles should be tested with the gear selector in D or O.

TRANSMISSION GEAR SELECTION

AUTOMATICS

Place the selector in "D" or "O" and check for critical condition.

Type	Gears to be Tested
GM 4-speed	4th gear, converter clutch engaged 3rd gear, converter clutch disengaged 2nd gear, converter clutch disengaged
GM 3-speed	3rd gear, converter clutch engaged 3rd gear, converter clutch disengaged 2nd gear, converter clutch disengaged
Ford 4-speed overdrive	4th gear 3rd gear 2nd gear
Other 3-speed	3rd gear 2nd gear

MANUALS

5-speed	4th and 3rd gears
4-speed	4th and 3rd gears
3-speed	3rd and 2nd gears

(b) Maximum-Throttle Accelerations - Automatic Transmissions

For maximum-throttle accelerations in each of the gears and gear/converter clutch combinations specified above, accelerate at the detent/application condition according to the speed versus vacuum/pressure profiles determined in (a) from the minimum obtainable speed up to 60 mph (97 kph). If the transmission downshifts, abort and start the acceleration again. Start with the highest gear or gear/clutch combination and proceed in descending order.

(c) Maximum-Throttle Accelerations - Manual Transmissions

Select the highest gear as specified in the table above. Start at the lowest speed from which the vehicle will accelerate smoothly or 30 mph (48 kph), whichever is higher, and depress the throttle full throughout the acceleration up to 60 mph (97 kph).

Select the next lower gear specified in the table above and accelerate at full throttle from the minimum speed from which the vehicle will accelerate smoothly up to 60 mph (97 kph).

(d) Part-Throttle Accelerations (Both Automatic and Manual Transmissions)

Select the highest gear up to the minimum vehicle speed at which the converter clutch will engage, and the highest gear/converter clutch combination above this minimum speed, to obtain the critical part-throttle vacuum or pressure. To obtain the critical part-throttle vacuum/pressure, first operate at road load (constant speed), at 25, 35, 45, and 55 mph (40, 56, 72, and 88 kph) incremental speeds (if obtainable in the specified gear). At each speed, move the throttle (in 3 to 5 seconds) from the road-load vacuum to:

1. one inch Hg (3.4 kPa) above full-throttle vacuum for manual transmissions;

2. one inch Hg (3.4 kPa) above detent vacuum for automatic transmissions without converter clutches;

3. one inch Hg (3.4 kPa) above the minimum vacuum at which the converter clutch disengages for so-equipped automatic transmissions.

The vehicle brakes may be applied lightly, if necessary, to maintain vehicle speed during throttle fanning, except for vehicles with converter clutch transmissions or EGR cut-outs.

If knocking occurs within any of the vacuum/pressure ranges, establish the manifold vacuum/pressure which gives maximum knock intensity on each fuel series. This is the critical vacuum/pressure to be used for all subsequent constant-vacuum/pressure part-throttle accelerations from the minimum obtainable speed in the test gear to 60 mph (97 kph), or until the vehicle ceases to accelerate. This critical vacuum/pressure should be determined for each reference fuel series.

(2) Tank Fuel Observations on Vehicles with Owner's Questionnaire

Investigate for maximum-throttle and part-throttle knock as detailed in Item 3d(1). Define maximum knock intensity as per Item 3c. Record maximum knock intensity, speed of maximum knock intensity, and manifold vacuum/pressure at each operating condition.

(3) Vehicle Rating Procedure (for Rater)

Knock rating should be performed while in a normal seated position (head above instrument panel) with floor mats in place.

Step 1 - After Tank Fuel Observations, use a fuel estimated to give borderline knock in a given fuel series and investigate for incidence of knock under conditions as described in D.3.d.(1)(b) above, and D.3.d.(1)(c) above, whichever is applicable.

Step 2 - If no knock occurs, go to a lower octane number blend in that series and repeat Step 1.

Step 3 - If knock occurs at one or more of the operating conditions in Step 1, continue investigation at the critical condition(s) with higher octane blends until highest octane fuel giving knock is determined within one octane number or one blend (the next highest fuel gives no knock). Record maximum knock intensity on all fuels. Record speed of maximum knock intensity and manifold vacuum/pressure on highest octane fuel that knocks.

Step 4 - Using the lowest octane blend that did not knock in Step 3, investigate for incidence of part-throttle knock as described in D.3.d.(1)(d). If knock occurs, continue investigation at critical vacuum/pressure until requirement is defined. Record maximum knock intensity and critical manifold vacuum/pressure on all fuels, and speed of maximum knock intensity on highest octane fuel that knocks.

Step 5 - With FBRU fuel only, if no knock occurs in Step 4, go to a lower octane number blend and repeat Step 4. Discontinue part-throttle investigation if knock is not observed with a fuel four octane numbers lower than determined in Step 3.

Step 6 - For knock sensor-equipped vehicles after determination of maximum requirement, continue with lower octane blends until the lowest octane fuel giving borderline knock is determined.

The rating procedure is given in arrow diagram form on page D-24 for maximum requirement, and on page D-25 for minimum requirement, for knock sensor-equipped cars.

(4) Octane Number Requirement Over Speed Range

Octane requirements over the speed range will be obtained on primary reference fuels only, using throttle position for maximum requirements. These will be established by recording the knock-in and knock-out points during maximum requirement accelerations with each incremental fuel investigated. It may be necessary to test one or two additional lower octane fuels to describe the knocking characteristics over the speed range. Accelerate at maximum requirement throttle position from minimum obtainable speed as determined in 3d(1)(a), up to 3750 rpm, if necessary, in order to define requirements. These should be run to 60 mph (97 kph) unless required to terminate at 55 mph (88 kph) because of legal speed limits. If 3750 rpm cannot be attained in top gear, accelerations shall be discontinued and resumed in the next highest gear from 500 rpm below the engine speed at which top gear accelerations were determined.

When "A" knock is experienced, continue the acceleration, but back off on the throttle to maintain "B" knock until just prior to the knock-out point.

E. INTERPRETATION OF DATA

The data will be recorded on data sheet DFMF-11-1185. For knock sensor-equipped vehicles, two DFMF-11-1185 data forms should be filled out completely: one for maximum requirement, and one for minimum requirement. Octane requirements for all reference fuels shall be determined as follows:

1. If the knock intensity of the highest reference fuel giving knock is borderline, the requirement shall be reported as the octane number of that fuel.

2. If the knock intensity of the highest fuel giving knock is above borderline, the requirement shall be reported as the mid-point between the octane number of the fuel giving knock and that of the next highest fuel.

3. If the octane requirement in high gear is equal to the requirement in a lower gear, report the highest gear data.

4. For part-throttle requirements, report the data from the critical manifold vacuum/pressure observations.

5. For knock sensor-equipped vehicles, report the highest and lowest fuel giving borderline knock.

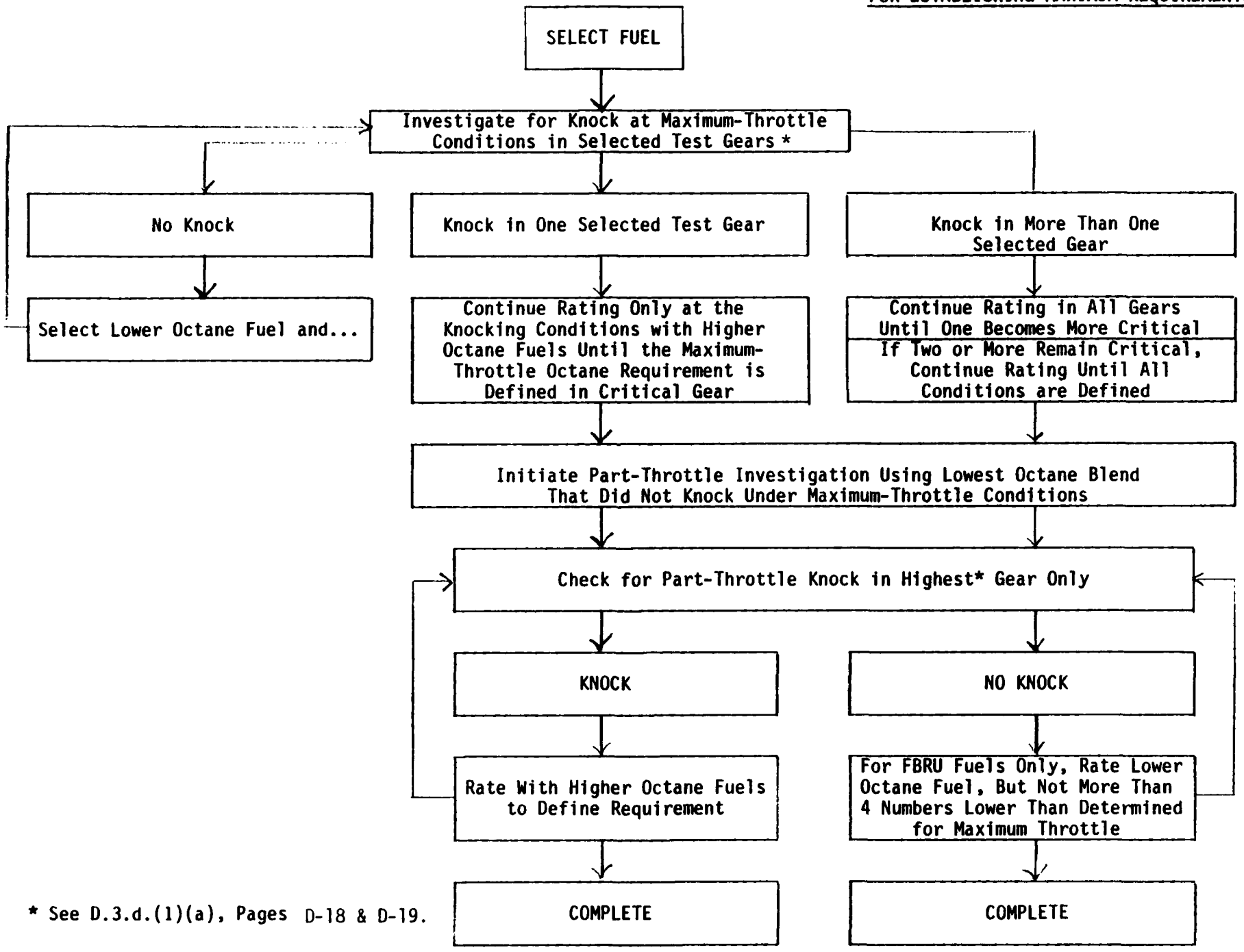
Speed range data shall be reported on data sheet DFMF-11-1185 as the engine speed of knock-in and knock-out for the octane number of the primary reference fuel tested.

Record data on all fuels tested, even though knock was not encountered. When transferring data to the summary block, record the higher requirement, either part-throttle or maximum-throttle condition for all fuels. If the higher requirement is part-throttle, record the part-throttle FBRU requirement in both the maximum and part-throttle columns. If part-throttle and maximum-throttle requirements are equal on FBRU fuels, record the maximum-throttle data in the maximum-requirement columns and the part-throttle data in the part-throttle columns. Use proper letter designation (see footnotes on data sheet) to designate requirements outside of the reference fuel limits or FBRU part-throttle requirement more than four numbers below maximum.

Requirements for the various engine speeds will be determined by fitting a smooth curve through the knock-in and knock-out points on work form DFMF-12-1185. Primary reference fuel requirements at various engine speeds should be reported to the nearest one-half octane number and recorded on the speed range summary block.

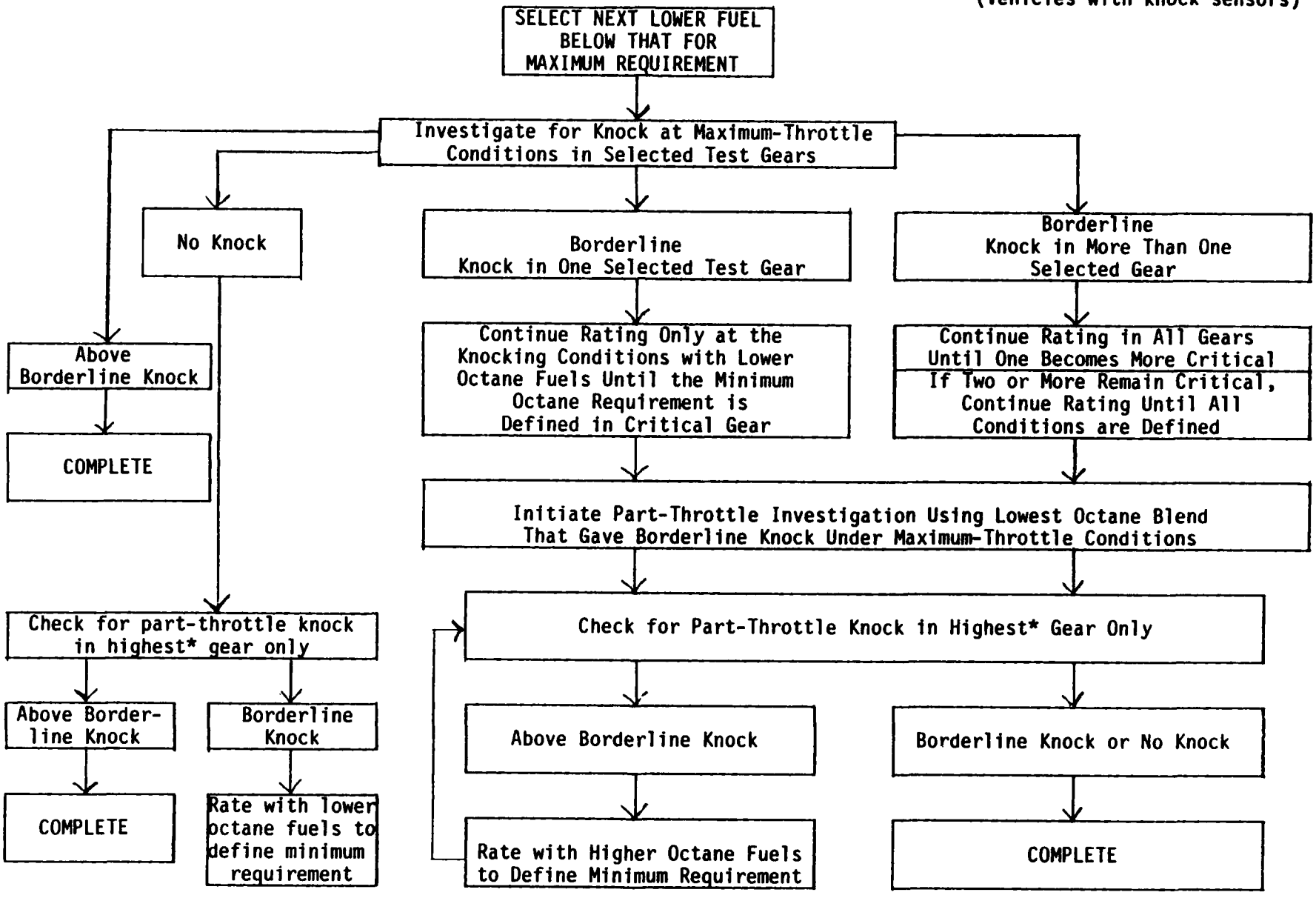
It is important that the vehicle identification number (VIN) of each vehicle tested be recorded on all data sheets to provide a means of cross-indexing.

FOR ESTABLISHING MAXIMUM REQUIREMENTS



* See D.3.d.(1)(a), Pages D-18 & D-19.

FOR ESTABLISHING MINIMUM REQUIREMENTS
(Vehicles with knock sensors)



* See D.3.d.(1)(a), Pages D-18 & D-19.

ANNEX A

to the

CRC E-15-85 TECHNIQUE

PROCEDURE FOR SETTING UP VEHICLES

WITH FUEL INJECTION

ANNEX A

TO THE CRC E-15-85 TECHNIQUE

PROCEDURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS -- VEHICLES EQUIPPED WITH MULTIPLE-PORT FUEL INJECTION

1. To run octane requirements on fuel-injected vehicles it is necessary to run an external fuel line to the inlet of the vehicle fuel injection pump.

2. The fuel return line from the engine to the fuel tank must be disconnected after the fuel pressure regulator (in engine compartment) and before the fuel tank. An auxiliary line long enough to reach the cans must be added to the fuel return line.

3. Make certain that the fuel tank connections are plugged; this means both the normal fuel pump inlet line and the normal fuel return line connection. On vehicles with an in-tank booster pump, this pump must be shut off so it cannot run during the time the vehicle is operating on the external fuel system. If this pump is not disconnected, it will be destroyed.

4. An electric fuel pump (Bendix type acceptable) must be used to draw fuel from the reference fuel can to supply the fuel injection pump on the vehicle. Caution must be exercised to keep the fuel line between the reference fuel cans and the vehicle fuel injection pump full of fuel. If very much air gets into this line, the fuel injection system will become air bound and it is difficult to get the air out of the system.

5. Once the fuel injection pump line and return line have been disconnected, all subsequent operations must be done from an external fuel source.

6. It is possible to use three-way valves in the fuel line between the fuel pump and the fuel tank and between the return line and the fuel tank. When used, the operator must change the return line valve to the auxiliary fuel system while the engine is shut down, to avoid building up excessive pressure in the return line which could damage both the fuel pressure regulator and injection pump.

7. When changing from one reference fuel to another, the following steps must be followed:

   a. Put fuel inlet line in reference fuel tank with the return line going to a slop fuel can. Do not keep fuel inlet line out of the fuel can any longer than is necessary to move it from one can to the next. DO NOT RUN OUT OF FUEL.

b. Observe the fuel stream in the fuel return line. As soon as a steady flow of fuel is observed, move the fuel return line to an empty one-quart can (0.946 ℓ). Allow one quart (0.946 ℓ) of fuel to flow into this can before inserting the return line into the chosen reference fuel can. This operation should take about 60 seconds.

c. When going to the next reference fuel, it will be necessary to repeat Steps a and b.

The fuel injection pumps on most vehicles pump between 30 and 50 gallons (114-189 ℓ/h) of fuel per hour. Therefore, Steps a and b should be folowed very closely or there will be gross reference fuel contamination, or you will use a lot more reference fuel than is required to run each test. If Steps a and b are followed exactly, you will be discarding to slop about two quarts (1.892 ℓ) of reference fuel each time you change reference fuels. The two quarts (1.892 ℓ) to slop will be at least as much fuel as is consumed to obtain the reference fuel rating.

CAUTION

For high-pressure fuel systems, be sure to relieve the pressure before disconnecting fuel lines. Also, use auxiliary fuel lines designed for high pressure. The engine and auxiliary fuel pump should be shut off while changing from auxiliary to tank fuels.

Diagnostic scanners should not be used while knock testing.

Auxiliary hoses should be rated for at least 250 psi working pressure and 1000 psi burst pressure.

PROCEDURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS -- VEHICLES EQUIPPED WITH THROTTLE-BODY FUEL INJECTION

The General Motors throttle-body fuel injection system is shown in the attached schematic drawing. The fuel supply system consists of an in-tank electric fuel pump, a full-flow fuel filter mounted on the vehicle frame, a fuel pressure regulator integral with the throttle body, fuel supply and return lines, and two fuel injectors. The injection timing and amount of fuel supplied is controlled by an electronic control module (not shown in figure). To prepare a vehicle with this system for octane requirement testing, an auxiliary electric fuel pump must be installed. The fuel pressure regulator controls fuel pressure at the injectors to a nominal 10.5 psi; therefore, an auxiliary pump capable of at least 10.5 psi outlet pressure must be used for satisfactory engine operation. The following procedure is recommended for preparing a vehicle with throttle-body fuel injection for octane requirement testing and for changing reference fuels during such testing:

1. Disconnect and plug the fuel supply and fuel return lines at the locations shown in the figure. Install an additional line between the fuel supply line and the outlet of the auxiliary pump. Connect the inlet of the auxiliary pump to the reference fuel can. Connect the fuel return line to the reference fuel can through a tee at the auxiliary pump inlet. All auxiliary fuel lines are indicated by dashed lines in the figure.

2. An optional arrangement would be to use three-way selector valves in the fuel supply and fuel return lines at the locations where auxiliary fuel lines are connected. When these valves are used, the operator must change the valves to the external fuel system while the engine is shut off to avoid building up excessive pressure in the fuel return line.

3. Disconnect the in-tank fuel pump so it cannot run during the time the vehicle is operating on the external fuel system. If this pump is not disconnected, it may be destroyed.

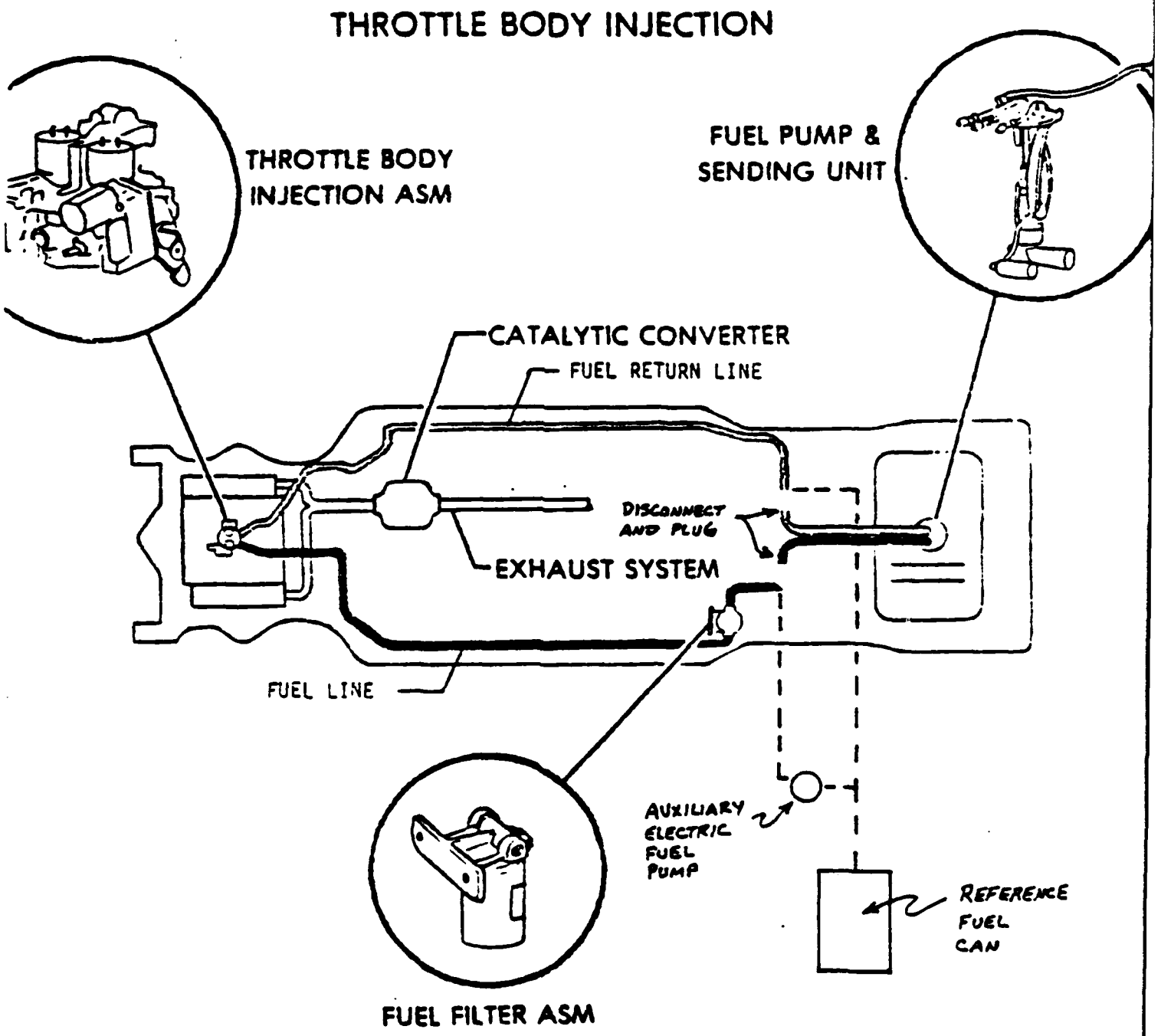
4. When changing from one reference fuel to another, the following steps should be followed:

   a. Disconnect fuel inlet line from reference fuel can and run engine a short time; do not run out of fuel since this will introduce air into the fuel injection system, and excessive cranking will be required to restart the engine.

   b. Insert fuel inlet line in desired reference fuel can; operate vehicle for two miles at a maximum speed of 55 mph during which time four part-throttle accelerations are made. This must be done to ensure that the vehicle fuel system has been purged and contains the desired reference fuel for octane rating.

   c. When changing to another reference fuel, repeat Steps a and b.

PROCEDURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS
-- VEHICLES EQUIPPED WITH THROTTLE-BODY FUEL INJECTION - (Continued)



PROCEDURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS -- FORD VEHICLES EQUIPPED WITH CENTRAL FUEL INJECTION SYSTEM

A vehicle schematic of one of Ford's central fuel injection systems is shown on the following drawing (other systems vary in configuration dependent upon engine/model type - see note 1). This fuel system consists of: an electric in-tank fuel pump, primary and secondary full-flow fuel filters, throttle-body assembly with integral fuel pressure regulator and two fuel injectors, fuel supply and return lines. The following procedure is recommended for preparing the vehicle for octane requirement testing:

1. Relieve pressure in fuel system using valve provided on throttle body. Fuel supply lines will remain pressurized for long periods of time after engine shut down. Disconnect and cap the fuel supply and fuel return lines leading from the fuel tank. Access to connection points may be obtained through either the: rear wheel wells, underbody, or engine compartment, dependent upon vehicle type. Install additional lines to the open supply and return lines and lead these lines back into the vehicle.

2. Connect the added fuel supply line to an auxiliary fuel pump. The fuel pressure regulator in the throttle body controls fuel pressure to a nominal 39.9 psi; therefore, it requires an auxiliary fuel pump capable of providing at least 45 psi outlet pressure (see note 1). The added 5.1 psi is needed to sufficiently overcome the pressure head and line restriction losses. Connect a supply line to the auxiliary pump from the reference fuel can. A fuel filter may be required between the auxiliary pump and reference fuel can to protect the pump. Also, connect the added fuel return line to the fuel reference can and vent the reference can to outside the vehicle.

3. Disconnect the electrical supply to the electric in-tank fuel pump, either by disconnecting the plug on the fuel tank or by disarming the inertia switch located in the trunk. Failure to disarm the in-tank fuel pump may result in a damaged pump. The voltage supplied to the inertia switch may be used as an electrical source for the auxiliary fuel pump. This voltage source is controlled by the on-board computer allowing the auxiliary pump to respond the same as would the in-tank fuel pump. When making this connection, do not "splice" into the wire, instead connect the wire lead to the connector.

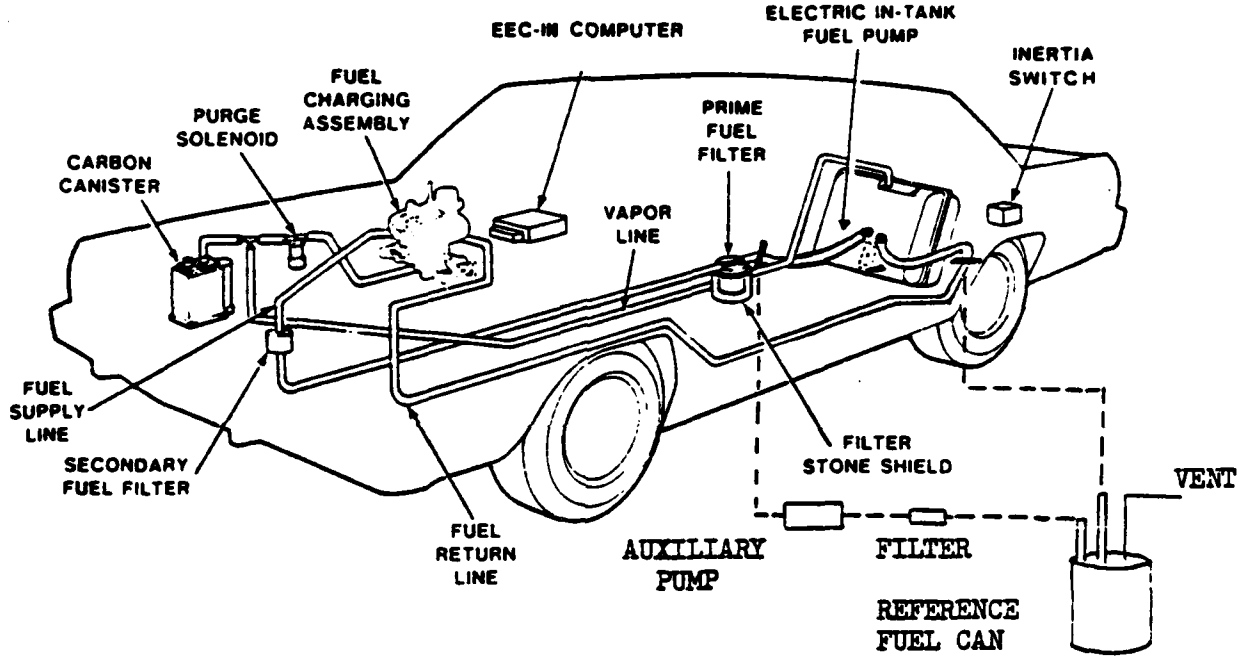
4. When changing from one reference fuel to another, the following steps should be followed, or else reference fuels may become contaminated:

   a. With the engine shut off, disconnect the fuel return line from the reference fuel can and connect it to an extra empty can. Connect the fuel pump supply line to the new reference fuel can and run the engine for approximately 30 seconds, purging the old reference fuel into the extra can (timing is dependent upon length of added fuel lines). After the sytem is purged, shut the engine off and connect the fuel return line to the new reference fuel can forming a closed fuel loop. Now the vehicle is ready to be tested on the desired reference fuel.

   b. When changing to another reference fuel, repeat Step a.

PROCEDURE FOR SETTING UP VEHICLES AND HANDLING REFERENCE FUELS
-- FORD VEHICLES EQUIPPED WITH CENTRAL FUEL INJECTION SYSTEM - (Continued)

CENTRAL FUEL INJECTION
FUEL SYSTEM
(5.0L LINCOLN/MARK VI)



1/ NOTE:

Some vehicles have both a low pressure in-tank fuel pump and a high pressure under body fuel pump. The on-board high pressure pump may be used if supplied with an auxiliary pump. In all cases, it is required that on-board pumps not used, be disarmed. The inertia switch located in the rear of the vehicle will disarm both pumps. Fuel lines on some vehicles may be accessed only in the engine compartment, or by dropping the fuel tank.

APPENDIX E

1985 OCTANE NUMBER REQUIREMENT SURVEY DATA

GLOSSARY

(For Appendix E Only)

Emission Certification (EMCT):	A	Altitude
	C	California
	F	Federal
	B	Both California and Altitude
Knock Sensor (KNK SEN):	Y	Yes
	N	No
Air Conditioner:	Y	Yes
	N	No
Spark Advance:	+	Before Top Center
	-	After Top Center
Test Fuel:	1	Tank Fuel
	2	FBRSU
	3	FBRU
	4	PR
Octane Number Requirements: (expressed as Research ON)	L	Less than lowest available ON for FBRU and FBRSU fuels and less than 76 for PR fuels
	H	Higher than highest available ON for FBRU and FBRSU fuels and higher than 100 ON for PR fuels
	F	Part-throttle requirement greater than four numbers below maximum-throttle requirement
Throttle (THR):	M	Maximum
	P	Part
Gear:	1-5	Manual and Automatic
Torque Converter (CONV):	N	Not tested in lockup
	Y	Tested in lockup
Manifold Vacuum (MV):	Inches Hg, positive (+) for vacuum, negative (-) for pressure	
Owner-Reported Knock (OWKNK):	Y	Yes, Not Objectionable
	O	Objectionable
	N	No
Rater-Reported Noise Intensity (NINT):	N	None
	B	Borderline
	A	Above Borderline

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION									
																MAXIMUN				PART THROTTLE									RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	THA	GOV	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OCT NO RES	OCT NO MOT	INT	THR	GEAR	RPM	MV		
367	6	BAA	P18A3	F N	8.5	Y	+ 6	+ 6	10512	55	29.91	25	3	86.0	M	N	2800	0.4					1	93.2	82.0	N						
													2	89.0	M	N	2800	0.4													
													4	83.0	M	N	2800	0.4													
116	28	BAB	T18M5	F Y H	10.0	Y	+ 6	+ 6	10359	70	29.39	50	3	86.0	M	N	1550	0.5	F				1			N						
													2	87.0	M	N	1500	0.5													
													4	86.0	M	N	1450	0.5													
117	28	BAB	T18M5	F Y L	10.0	Y	+ 6	+ 6	10359	70	29.39	50	3	85.0	M	N	1450	0.5	F				1									
													2	86.0	M	N	1500	0.5													
													4	82.0	M	N	1350	0.5													
200	28	BAB	T18M5	F Y H	10.0	Y	+ 6	+ 6	8341	70	30.39	50	3	86.0	M	N	1500	0.5	F				1			N						
													2	86.0	M	N	1500	0.5													
													4	84.0	M	N	1450	0.5													
201	28	BAB	T18M5	F Y L	10.0	Y	+ 6	+ 6	8341	70	30.39	50	3	84.0	M	N	1450	0.5	F				1									
													2	85.0	M	N	1400	0.5													
													4	83.5	M	N	1450	0.5													
317	40	DGE	TP22A3	F Y H	8.1	Y	+12	+12	6195	49	29.98	37	3	91.5	M	N	3250	-5.0	F				1			B	M	2	3100	-5.0		
													2	93.0	M	N	2900	-5.0													
													4	93.0	M	N	3100	-5.0													
318	40	DGE	TP22A3	F Y L	8.1	Y	+12	+12	6195	49	29.98	37	3	91.5	M	N	3250	-5.0	F				1									
													2	93.0	M	N	2900	-5.0													
													4	93.0	M	N	3100	-5.0													
43	8	DHD	T22A3	F N	9.0	Y	+12	+12	7682	80	30.02	78	3	86.0	M	N	1950	1.5	82.0	3	1750	4.0	1			N						
													2	87.0	M	N	2750	1.0													
													4	84.0	M	N	1850	1.5													
279	5	DHD	T22A3	F N	9.0	Y	+12	+12	6584	70	29.97	62	3	93.0	M	N	2200	1.0	F				1	N	92.2	82.7	A	M	2	2600	1.0		
													2	95.0	M	N	2500	1.0													
													4	91.0	M	N	2150	1.0													
327	46	DHD	T22A3	F N	9.0	Y	+12	+12	6070	80	29.62	86	3	89.0	M	Y	2150	1.0	87.0	3	2150	2.0	1	N		N						
													2	90.0	M	Y	2250	1.0													
													4	87.0	M	Y	2250	1.0													
192	47	DHE	TP22A3	C Y H	8.1	Y	+12	+12	8300	70	30.11	50	3	94.0	M	N	3300	-6.0	92.0	3	3200	-3.0	1									
													2	94.5	M	N	3300	-6.0													
													4	94.0	M	N	3100	-6.0													
193	47	DHE	TP22A3	C Y L	8.1	Y	+12	+12	8300	70	30.11	50	3	93.0	M	N	3300	-6.0	91.0	3	3300	-3.0	1									
													2	94.0	M	N	3300	-6.0													
													4	93.0	M	N	3100	-6.0													

OBS NO	LAB NO	VEHICLE DESCRIPTION: MODEL CODE	EM CT	KNK SEN	C.R.	SPARK ADVANCE: AIR	AS RCD	AS TST	ODOM MILES	WEATHER: AMB TMP	BAROM	HUM	FUEL	MAXIMUM: OCT NO	GTHR	GEAR	COOL TEMP	MV	PART THROTTLE: OCT NO	GEAR	RPM	MV	FUEL	40 K	OCT RES	OCT MOT	RATER: MIT	GTHR	GEAR	RPM	MV
294	28	DHE TP22A3	F	Y H	8.1	Y	+12	+12	9571	70	29.18	50	3	95.0	M	2	N 2600	0.5	92.0	3	2000	2.0	1			B	M	2	2500	0.5
													2	95.0	M	2	N 2600	0.5												
													4	92.0	M	2	N 2500	0.5												
205	28	DHE TP22A3	F	Y L	8.1	Y	+12	+12	9571	70	29.18	50	3	94.0	M	2	N 2450	0.5	91.5	3	2000	2.0	1							
													2	94.0	M	2	N 2500	0.5												
													4	91.0	M	2	N 2500	0.5												
206	28	DHE TP22A3	F	Y H	8.1	Y	+12	+12	9688	70	29.07	50	3	94.0	M	2	N 2800	0.5	92.0	3	2200	3.0	1				M			
													2	94.0	M	2	N 2800	0.5												
													4	93.0	M	2	N 2500	0.5												
207	28	DHE TP22A3	F	Y L	8.1	Y	+12	+12	9688	70	29.07	50	3	93.0	M	2	N 2800	0.5	91.5	3	2100	3.0	1							
													2	93.0	M	2	N 2900	0.5												
													4	92.5	M	2	N 2500	0.5												
336	47	DHE TP22A3	C	Y H	8.1	Y	+12	+12	8500	70	30.15	40	3	94.0	M	3	N 3000	-6.0	92.0	3	2850	-3.0	1							
													2	94.0	M	3	N 3200	-6.0												
													4	93.0	M	3	N 3000	-6.0												
337	47	DHE TP22A3	C	Y L	8.1	Y	+12	+12	8500	70	30.15	40	3	93.0	M	3	N 3000	-6.0					1							
													2	93.0	M	3	N 3050	-6.0												
													4	92.0	M	3	N 3050	-6.0												
280	5	DMP 252A3	F	Y H	8.7	Y	+ 7	+ 7	12888	69	29.81	50	3	87.0	P	3	Y 1500	8.0	87.0	3	1500	8.0	1				N			
													2	90.0	P	3	Y 1300	8.0												
													4	84.0	M	3	Y 1450	2.6												
281	5	DMP 252A3	F	Y L	8.7	Y	+ 7	+ 7	12888	69	29.81	50	3	86.0	P	3	Y 1500	8.0	86.0	3	1500	8.0	1							
													2	88.0	P	3	Y 1450	8.0												
													4	84.0	M	3	Y 1450	2.6												
30	29	GC8 T41A4	F	N	8.5	Y	+10	+10	10196	70	30.30	58	3	88.0	M	2	Y 2200	1.3	F				1	N			N			
													2	90.0	M	2	Y 2100	1.3												
													4	87.5	M	2	Y 2300	1.3												
65	8	GC8 T41A4	A	N	8.5	Y	+10	+10	8198	83	29.74	112	3	85.0	M	4	Y 1350	1.0	F				1				N			
													2	86.0	M	4	Y 1300	1.0												
													4	82.0	M	4	Y 1400	1.0												
246	23	GC8 T41A4	F	N	8.5	Y	+11	+10	9103	58	29.45		3	84.0	M	4	Y 1500	1.4	82.0	4	1400	2.5	1				N			
													2	84.0	M	4	Y 1500	1.4												
													4	83.0	M	3	N 2200	1.0												
272	7	GC8 T41A4	F	N	8.5	Y	+13	+10	25916	70	30.48	54	3	91.0	M	4	Y 1200	1.3	F				1	N	98.8	89.0	N			
													2	92.0	M	4	Y 1300	1.3												
													4	86.0	M	2	N 2200	1.0												
306	5	GC8 T41A4	F	N	8.5	Y	+10	+10	10870	71	30.05	54	3	89.0	M	3	N 1350	1.7	F				1				B	M	3	1200	1.8
													2	90.0	M	3	N 1300	1.6												
													4	88.0	M	3	N 1250	1.8												

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
							SPARK ADVANCE										MAXIMUM				PART THROTTLE							RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	A I R	C.R.	RCD	TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	TEST	GAR	CON	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OCTANE NO RES	OCTANE NO MOT	NITR	GEAR	RPM	MV
325	40	GC8	T41A4	F	N	8.5	Y	+10	+10	9265	52	29.97	39	3	87.5	M	4	Y	1500	0.5	F			1			N			
														2	89.0	M	4	Y	1250	1.0										
														4	88.5	M	4	Y	1600	0.5										
364	47	GC8	T41A4	C	N	8.5	Y	+10	+10	11400	70	30.27	35	3	88.0	M	2	N	3400	1.0	F			1						
														2	90.0	M	2	N	3500	1.0										
														4	83.0	M	2	N	3000	1.0										
383	6	GC8	T41A4	F	N	8.5	Y	+10	+10	11380	58	29.68	41	3	88.0	M	4	N	1600	1.5	86.0	4	1500	2.5	1	N	93.1	82.8	N			
														2	91.5	M	2	N	3500	1.6										
														4	87.0	M	4	N	1700	1.5										
428	26	GC8	T41A4	F	N	8.5	Y	+12	+10	33238	76	29.97	96	3	81.0	M	2	N	2000	0.8	L			1		92.3	82.4	N			
														2	81.0	M	4	Y	1600	0.8										
														4	79.0	M	4	Y	1600	0.8										
247	23	GD8	T41A4	F	N	8.5	Y	+10	+10	22212	56	28.88		3	90.0	M	4	Y	1550	1.0	89.0	4	1600	2.0	1				N			
														2	92.0	M	4	Y	1600	1.0										
														4	87.0	M	4	Y	1500	1.0										
173	41	GE8	T41A4	C	N	8.5	Y	+10	+10	6747	66	30.39	55	3	86.0	M	3	N	2600	1.8	F			1	N	97.8	88.0	N			
														2	87.0	M	3	N	2600	1.8										
														4	85.0	M	3	N	2600	1.8										
273	7	GE8	T41A4	F	N	8.5	Y	+10	+10	8410	72	30.19	58	3	88.0	P	3	N	2200	3.0	88.0	3	2200	3.0	1	N	95.1	87.4	N			
														2	90.0	M	3	N	2500	1.4										
														4	85.0	M	2	N	2300	1.0										
159	47	GJW	P28A3	C	N	8.9	Y	+10	+10	9500	70	30.08	50	3	87.5	M	3	Y	3250	0.8	85.0	3	3000	1.8	1							
														2	88.5	M	3	Y	3000	0.8										
														4	85.5	M	3	Y	3000	0.8										
194	47	GJW	P28A3	C	N	8.9	Y	+ 6	+10	6500	70	29.82	50	3	90.0	M	2	N	4250	0.8	F			1						
														2	91.5	M	2	N	4250	0.8										
														4	87.5	M	2	N	3750	0.8										
195	47	GJW	P28A3	C	N	8.9	Y	+10	+10	7400	70	29.99	50	3	81.0	M	3	Y	2300	0.5	79.0	3	2300	1.5	1							
														2	83.0	M	3	N	4250	0.5										
														4	81.0	M	2	N	3900	0.5										
196	47	GJW	P28A3	C	N	8.9	Y	+10	+10	7000	70	30.21	39	3	85.0	M	3	Y	2600	1.2	84.0	3	2500	1.5	1							
														2	86.0	M	3	Y	2800	1.2										
														4	94.0	M	2	N	4250	0.5										
197	47	GJW	P28A3	C	N	8.9	Y	+10	+10	9200	70	30.28	36	3	87.0	M	2	N	4000	0.8	85.0	3	2250	1.5	1							
														2	88.0	M	2	N	4250	0.8										
														4	86.0	M	2	N	3500	0.8										
248	23	GJW	P28A3	F	N	8.9	Y	+ 8	+10	7877	50	29.43		3	86.0	M	3	N	2600	1.0	85.0	3	1600	3.0	1				N			
														2	87.0	M	3	N	2600	1.0										
														4	85.0	M	3	N	2600	1.0										

OBS NO	LAB NO	MODEL CODE	EM CT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM GTEAR	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	OCTANE FUEL UNK	RATER OCT RES	RATER OCT MOT	RATER INTR	RATER GTEAR	RATER RPM	RATER MV
343	60	GJW P28A3	F	N	8.9	Y	+ 8	+10	8550	70	30.18	50	3	86.0	M 2 N	2200	1.5	86.0	3	1400	3.0	1 N	94.6	84.6	N			
													2	89.0	M 2 N	2200	1.5											
													4	82.0	M 2 N	2200	1.5											
352	62	GJW P28A3	F	N	8.9	Y	+10	+10	8370	72	30.20	50	3	86.0	M 3 N	2200	1.2	F				1 N	93.1	82.6	N			
													2	91.0	M 3 N	2300	1.2											
													4	81.0	M 3 N	2400	1.0											
353	62	GJW P28A3	F	N	8.9	Y	+10	+10	8000	72	30.16	56	3	85.0	M 2 N	2300	1.0	F				1 N	98.9	88.7	N			
													2	88.0	M 2 N	2500	1.0											
													4	82.0	M 2 N	2200	1.0											
447	46	GK8 T41A4	F	N	8.5	Y	+10	+10	12680	80	30.70	64	3	86.0	M 4 N	1825	1.0	84.0	4	1800	2.0	1 N			N			
													2	88.0	M 4 N	2025	1.0											
													4	86.0	M 4 N	1825	1.0											
10	29	HAR T25A3	F	N	9.0		+ 8	+ 8	24213	70	30.09	56	3	91.0	M 2 Y	2300	1.3	88.0	3	1800	6.0	1 N			N			
													2	94.0	M 2 Y	2400	1.3											
													4	86.5	M 2 Y	2200	1.3											
54	8	HAW P28A3	F	N	8.9	Y	+10	+10	10955	77	30.20	41	3	88.0	M 2 N	3800	0.8	84.0	3	1850	4.0	1			B	M	2	3700	0.8
													2	90.0	M 2 N	3700	0.8											
													4	86.0	M 2 N	3800	0.8											
415	26	HAW P28A3	F	N	8.9	Y	+10	+10	9415	72	30.24	54	3	83.0	M 2 N	3825	0.8	F				1 N	92.4	81.8	N			
													2	86.0	M 2 N	4000	0.8											
													4	86.0	M 2 N	3350	0.8											
55	8	HGA 238A3	F	Y H	8.0	Y	+15	+15	11565	74	29.67	104	3	86.0	M 3 Y	1300	2.6	84.0	3	1350	3.5	1			N			
													2	87.0	M 3 N	1700	1.2											
													4	83.0	M 3 Y	1400	2.2											
11	29	HJO T18A3	F	N	9.0	Y	+ 8	+ 8	25461	70	30.28	58	3	89.5	M 2 Y	3300	0.7	87.5	3	2600	2.0	1			N			
													2	95.0	M 3 Y	2700	0.8											
													4	88.0	M 2 Y	2800	0.7											
56	8	HJO T18A3	F	N	9.0	Y	+ 8	+ 8	14229	72	29.98	26	3	87.0	M 3 Y	2100	1.5	F				1			N			
													2	90.0	M 3 Y	2100	1.5											
													4	85.0	M 3 Y	2200	1.5											
57	8	HJO T19A3	F	N	9.0	Y	+ 8	+ 8	14860	78	29.60	92	3	86.0	M 3 Y	1900	2.1	F				1			N			
													2	87.0	M 3 Y	1950	2.1											
													4	84.0	M 3 Y	1900	2.1											
183	7	HJO T18A3	F	N	9.0	Y	+ 8	+ 8	8900	70	30.32	48	3	92.0	M 2 N	3350	0.6	90.0	3	2300	2.0	1 N	93.0	82.1	A	M	2	3600	0.6
													2	96.0	M 2 N	4100	0.6											
													4	90.0	M 3 N	2600	0.7											
330	46	HJO T18A3	F	N	9.0	Y	+ 5	+ 8	6937	80	29.40	75	3	83.0	P 3 N	2400	1.5	83.0	3	2400	1.5	1 N			N			
													2	84.0	M 3 N	2350	0.5											
													4	82.0	M 3 N	2350	0.5											

		VEHICLE DESCRIPTION							WEATHER				OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION							
														MAXIMUM						PART THROTTLE							RATER				
							SPARK ADVANCE																								
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	A IR C.R.		AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	GTHR	GTEA	GCON	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OMK N	OCT RES	OCT MOT	NITR	STHR	STEA	RPM	MV
58	8	HNL	P30A3	C	Y H	9.0	Y		19352	80	30.01	41	3	86.0	M	3	Y	1850	1.5	86.0	3	1850	4.0	1				N				
													2	87.0	M	3	Y	1800	1.5											
													4	85.0	M	3	Y	1850	1.5											
78	41	HNL	P30A3	C	Y H	9.0	Y		6711	75	30.04	57	3	94.0	M	3	Y	1800	2.0	F				1				B	M	3	1800	2.0
													2	95.0	M	3	Y	1800	2.0											
													4	93.0	M	3	Y	1800	2.0											
79	41	HNL	P30A3	C	Y L	9.0	Y		6711	75	30.04	57	3	84.0	M	3	Y	1800	2.0					1								
													2	84.0	M	3	Y	1800	2.0											
													4	83.0	M	3	Y	1800	2.0											
80	41	HNL	P30A3	C	Y H	9.0	Y		10965	70	30.10	56	3	96.0	M	3	Y	1900	2.2	F				1				B	M	3	1900	2.2
													2	96.0	M	3	Y	1900	2.2											
													4	94.0	M	3	Y	1900	2.2											
81	41	HNL	P30A3	C	Y L	9.0	Y		10965	70	30.10	56	3	86.0	M	3	Y	1800	2.2					1								
													2	87.0	M	3	Y	1800	2.2											
													4	85.0	M	3	Y	1800	2.2											
224	23	HNL	P30A3	F	Y H	9.0	Y		8347	50	29.33		3	92.0	M	3	Y	1500	0.6	91.0	3	1500	1.5	1				N				
													2	93.0	M	3	Y	1500	0.6											
													4	91.0	M	3	Y	1500	0.6											
225	23	HNL	P30A3	F	Y L	9.0	Y		8347	50	29.33		3	90.0	M	3	Y	1500	0.6					1								
													2	91.0	M	3	Y	1500	0.6											
													4	89.0	M	3	Y	1500	0.6											
293	5	HNL	P30A3	F	Y H	9.0	Y		9199	67	29.89	58	3	90.0	M	2	N	2550	0.8	87.0	3	1700	3.5	1	N	91.8	83.0	B	M	2	2550	0.8
													2	92.0	M	2	N	2400	0.8											
													4	87.0	M	2	N	2375	0.8											
294	5	HNL	P30A3	F	Y L	9.0	Y		9199	67	29.89	58	3	88.0	M	2	N	2500	0.8					1								
													2	89.0	M	2	N	2450	0.8											
													4	86.0	M	2	N	2400	0.8											
378	6	HNL	P30A3	F	Y H	9.0	Y		8950	68	30.10	74	3	92.0	M	3	N	3000	0.4					1	N	94.6	83.8	N				
													2	93.0	M	3	N	3000	0.4											
													4	90.0	M	3	Y	2000	0.4											
379	6	HNL	P30A3	F	Y L	9.0	Y		8950	68	30.10	74	3	90.0	M	3	N	3000	0.4					1								
													2	91.0	M	3	N	3000	0.4											
													4	89.0	M	3	Y	2000	0.4											
416	26	HNL	P30A3	F	Y H	9.0	Y		10883	65	30.24	30	3	96.0	M	3	Y	2050	1.0	94.0	3	2050	3.5	1	N	92.2	81.8	A	M	3	2050	1.0
													2	98.0	M	3	Y	2050	1.0											
													4	94.0	M	3	Y	2050	1.0											
417	26	HNL	P30A3	F	Y L	9.0	Y		10883	65	30.24	30	3	95.0	M	3	Y	2050	0.8					1								
													2	97.0	M	3	Y	2050	1.0											
													4	91.0	M	3	Y	2050	0.8											

OBS NO	LAB NO	MODEL CODE	VEHICLE DESCRIPTION: EM CT	KNK SEN	C.R.	SPARK ADVANCE AIR	SPARK ADVANCE RCD AS	SPARK ADVANCE TST AS	ODOM MILES	WEATHER: AMB TMP	BAROM	HUM	FUEL LEVEL	MAXIMUM OCTANE NUMBER REQUIREMENT DATA: OCT NO	THR	GEAR	RPM	MV	PART THROTTLE OCTANE NUMBER REQUIREMENT DATA: OCT NO	THR	GEAR	RPM	MV	TANK FUEL INFORMATION: FUEL LEVEL	OAK	RATER: OCT NO RES	OCT NO MOT	RATER: VINT	RATER: GTHR	RATER: GEAR	RATER: RPM	RATER: MV
441	46	HNL P30A3	F	Y H	9.0	Y			9634	73	29.27	80	3	90.0	M	3	Y 2050	1.0	86.0	3	3	2300	2.0	1	N			N				
													2	91.0	M	3	Y 1850	1.0														
													4	88.0	M	3	Y 1900	1.0														
442	46	HNL P30A3	F	Y L	9.0	Y			9634	73	29.27	80	3	87.0	M	3	Y 2000	1.0						1								
													2	87.0	M	3	N 2700	1.0														
													4	87.0	M	3	Y 2000	1.0														
295	5	HP9 P28A3	F	N	8.5	Y	+10	+10	11106	71	30.10	50	3	90.0	P	3	Y 2100	8.0	90.0	3	3	2100	8.0	1	N	91.4	82.4	N				
													2	90.0	P	3	Y 1900	8.0														
													4	90.0	M	3	N 3050	3.1														
322	40	HP9 P28A3	F	N	8.5	Y	+10	+10	11353	33	30.32	27	3	93.0	M	2	N 2750	0.0	F					1				B	M	2	2850	0.5
													2	93.5	M	3	Y 3300	1.0														
													4	90.5	M	2	N 3000	0.0														
362	47	HP9 P28A3	C	N	8.5	Y	+10	+10	17800	70	30.00	48	3	90.0	M	3	N 3000	0.5	89.0	3	3	3000	1.5	1								
													2	92.0	M	3	N 3100	0.5														
													4	88.0	M	3	N 3000	0.5														
15	29	IA3 P38A4	F	Y H	8.0	Y	+15	+15	9471	70	30.20	60	3	87.5	P	4	Y 1600	5.0	87.5	4	4	1600	5.0	1	N			N				
													2	91.0	M	3	Y 2350	1.0														
													4	84.5	M	2	Y 2500	0.9														
16	29	IA3 P38A4	F	Y L	8.0	Y	+15	+15	9471	70	30.20	60	3	78.0	M	3	Y 2600	1.0						1								
													2	78.0	M	2	Y 2600	0.9														
													4	80.0	M	2	Y 2600	0.9														
184	7	IA3 P38A4	F	Y H	8.0	Y	+15	+15	6885	70	30.15	56	3	90.0	M	2	N 2950	1.2	86.0	4	4	1400	2.0	1	N	93.3	82.1	B	M	2	2900	1.2
													2	94.0	M	2	N 3000	1.2														
													4	88.0	M	2	N 3100	1.2														
298	5	IA3 P38A4	F	Y H	8.0	Y	+15	+15	14990	72	30.30	53	3	90.0	M	4	Y 1500	1.2	F					1	N	92.2	82.4	N				
													2	91.0	M	4	Y 1500	1.1														
													4	90.0	M	4	Y 1450	1.1														
299	5	IA3 P38A4	F	Y L	8.0	Y	+15	+15	14990	72	30.30	53	3	90.0	M	4	Y 1500	1.2						1								
													2	90.0	M	4	Y 1550	1.1														
													4	90.0	M	4	Y 1450	1.1														
59	8	IAE 230A3	F	Y H	8.4	Y	+15	+15	14170	82	29.89	66	3	85.0	M	3	Y 1700	1.8	82.0	3	3	1650	3.0	1				N				
													2	86.0	M	3	Y 1700	1.8														
													4	84.0	M	3	Y 1700	1.8														
226	23	IAE 230A3	F	Y H	8.4	Y	+15	+15	12171	64	28.78		3	89.0	M	3	Y 1550	1.0	87.0	3	3	1500	2.0	1				N				
													2	90.0	M	3	Y 1550	1.0														
													4	88.0	M	3	Y 1500	1.0														
227	23	IAE 230A3	F	Y L	8.4	Y	+15	+15	12171	64	28.78		3	84.0	M	3	Y 1500	1.0						1								
													2	85.0	M	3	Y 1500	1.0														
													4	83.0	M	3	Y 1500	1.0														

VEHICLE DESCRIPTION — WEATHER — OCTANE NUMBER REQUIREMENT DATA (MAXIMUM; PART THROTTLE) — TANK FUEL INFORMATION (RATER)

OBS NO	LAB NO	MODEL CODE	EMCT	KNK GEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	THR	GEAR	CONV	RPM	MV	PART THROTTLE OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT NO RES	OCT NO MOT	RATER NINT	THR	GEAR	RPM	MV
296	5	IAE 230A3	F	Y H	8.4	Y	+15	+15	15230	68	29.97	51	3	91.0	M	3	Y	1500	1.2	87.0	3	1450	7.0	1	N	96.8	85.1	N				
													2	91.0	M	3	Y	1525	1.2													
													4	90.0	M	3	Y	1675	1.2													
297	5	IAE 230A3	F	Y L	8.4	Y	+15	+15	15230	68	29.97	51	3	90.0	M	3	Y	1700	1.2					1								
													2	91.0	M	3	Y	1525	1.2													
													4	90.0	M	3	Y	1675	1.2													
418	26	IAE 230A3	F	Y H	8.4	Y	+15	+15	11275	64	29.85	54	3	84.0	M	3	Y	1600	0.8	F				1		91.9	82.4	N				
													2	88.0	M	3	Y	1700	0.8													
													4	78.0	M	3	Y	1650	0.8													
419	26	IAE 230A3	F	Y L	8.4	Y	+15	+15	11275	64	29.85	54	3	L										1								
													2	80.0	M	3	Y	1650	0.8													
													4	L																		
12	29	IAE 230A4	F	Y H	8.4	Y	+15	+15	7047	70	30.28	56	3	93.5	M	4	N	2300	1.2	F				1		92.4	83.1	A	M	4	2500	1.2
													2	95.5	M	3	N	2400	1.2													
													4	87.5	M	4	N	2300	1.2													
13	29	IAE 230A4	F	Y L	8.4	Y	+15	+15	7047	70	30.28	56	3	80.0	M	4	N	2400	1.2	L				1								
													2	82.5	M	4	N	2500	1.2													
													4	80.0	M	4	N	2400	1.2													
14	29	IAR T25A3	F	N	9.0	Y	+ 8	+ 8	21834	70	30.10	58	3	94.0	M	2	Y	2400	1.5	93.0	3	1400	9.0	1		92.3	86.4	A	M	2	2500	1.5
													2	95.5	M	2	Y	2400	1.5													
													4	90.0	M	2	Y	2800	1.5													
228	23	IAR T25A3	F	N	9.0	Y	+ 8	+ 8	19570	53	30.00	32	3	94.0	M	3	Y	2000	1.0	92.0	3	1700	2.0	1				A	M	3	1750	1.4
													2	97.0	M	3	Y	1650	1.4													
													4	92.0	M	3	Y	1800	1.4													
17	29	IBY 450A4	F	N	8.0	Y	+20	+20	15229	70	30.28	56	3	96.0	M	2	Y	1700	1.0	95.0	4	1400	8.0	1		92.5	83.2	A	M	2	2600	1.0
													2	96.0	M	2	Y	2200	1.0													
													4	93.0	M	2	Y	1900	1.0													
60	8	IBY 450A4	F	N	8.0	Y	+20	+20	10573	80	30.21	29	3	92.0	M	2	N	2500	0.6	88.0	4	1150	5.0	1				B	M	2	2500	0.6
													2	93.0	M	2	N	2500	0.6													
													4	88.0	M	3	N	2050	1.0													
61	8	IBY 450A4	F	N	8.0	Y	+20	+20	17762	78	30.02	40	3	90.0	M	3	N	1850	1.5	88.0	3	1000	5.0	1				B	M	3	2000	1.5
													2	91.0	M	3	N	1950	1.5													
													4	88.0	M	3	N	2000	1.5													
185	7	IBY 450A4	F	N	8.0	Y	+20	+20	6966	70	30.48	49	3	94.0	M	2	N	2100	0.5	90.0	4	1250	3.0	1	N	97.9	86.5	N				
													2	94.0	M	2	N	3050	0.5													
													4	90.0	M	2	N	2000	0.5													
229	23	IBY 450A4	F	N	8.0	Y	+20	+20	12195	50	29.13		3	96.0	M	3	N	2650	1.0	94.0	4	1450	5.0	1				A	M	3	2700	1.0
													2	97.0	M	3	N	2650	1.0													
													4	92.0	M	3	N	2550	1.0													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
													MAXIMUM						PART THROTTLE									RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	SPARK ADVANCE AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	THR	GEAR	CONV	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	DWK	OCT RES	OCT MOT	NIT	THR	GEAR	RPM	MV
266	7	IBY 450A4	F	N	8.0	Y	+20	+20	10377	68	30.42	47	3	92.0	M	3	N	2200	1.7	F				1	N	93.0	82.1	B	M	3	2200	1.7
													2	94.0	M	3	N	2100	1.7											
													4	88.0	M	3	N	2100	1.7											
263	47	IBY 450A4	C	N	8.0	Y	+18	+20	7500	70	30.21	43	3	93.0	P	4	Y	1300	8.0	93.0	4	1300	8.0	1								
													2	91.0	M	3	N	2150	0.5											
													4	88.0	M	3	N	2000	0.5											
420	26	IBY 450A4	F	N	8.0	Y	+20	+20	13587	71	30.38	43	3	91.0	P	4	Y	1350	7.0	91.0	4	1350	7.0	1				A	P	4	1550	7.0
													2	96.0	P	4	Y	1400	7.0											
													4	89.0	M	4	N	1850	1.8											
18	29	IC3 P38A4	F	Y	H	8.0	Y	+15	+15	17192	70	30.09	63	3	98.0	M	4	Y	1800	1.8	95.5	4	1800	3.5	1		92.8	83.3	A	M	4	1800	1.8
													2	102.0	M	4	Y	1800	1.8											
													4	87.0	M	2	Y	2000	1.3											
19	29	IC3 P38A4	F	Y	L	8.0	Y	+15	+15	17912	70	30.09	63	3	88.0	M	3	Y	1900	1.8					1								
													2	93.0	M	3	Y	2000	1.8											
													4	80.0	M	2	Y	2000	1.3											
82	41	IC3 P38A4	C	Y	H	8.0	Y	+15	+15	6861	72	29.80	60	3	96.0	M	4	Y	1450	1.0	F				1				B	M	4	1450	1.0
													2	96.0	M	4	Y	1450	1.0											
													4	95.0	M	4	Y	1450	1.0											
83	41	IC3 P38A4	C	Y	L	8.0	Y	+15	+15	6861	72	29.80	60	3	82.0	M	4	Y	1450	1.0					1								
													2	82.0	M	4	Y	1450	1.0											
													4	79.0	M	4	Y	1450	1.0											
230	23	IC3 P38A4	F	Y	H	8.0	Y	+13	+15	14825	45	29.23		3	82.0	M	2	N	2400	0.6	80.0	4	1300	2.0	1				N				
													2	87.0	M	2	N	2400	0.6											
													4	82.0	M	2	N	2200	0.6											
231	23	IC3 P38A4	F	Y	L	8.0	Y	+13	+15	14825	45	29.23		3	82.0	M	4	Y	1300	0.8					1								
													2	80.0	M	2	N	2100	0.4											
													4	L																		
267	7	IC3 P38A4	F	Y	H	8.0	Y	+17	+15	7002	74	29.96	73	3	84.0	M	2	N	2600	1.0	F				1	N	92.4	81.9	N				
													2	86.0	M	3	N	2200	1.6											
													4	78.0	M	2	N	2400	1.0											
300	5	IC3 P38A4	F	Y	H	8.0	Y	+15	+15	24605	70	30.10	50	3	93.0	P	3	N	2400	8.0	93.0	3	2400	8.0	1	0	92.0	82.5	A	M	4	1450	1.2
													2	93.0	P	3	N	2400	8.0											
													4	84.0	M	3	N	2350	2.2											
301	5	IC3 P38A4	F	Y	L	8.0	Y	+15	+15	24605	70	30.10	50	3	93.0	P	3	N	2400	8.0					1								
													2	92.0	P	3	N	2250	8.0											
													4	84.0	M	3	N	2350	2.2											
331	46	IC3 P38A4	F	Y	H	8.0	Y	+15	+15	9380	82	29.52	84	3	80.0	M	4	Y	1575	1.5	L				1	N			N				
													2	81.0	M	4	Y	1575	1.5											
													4	78.0	M	4	Y	1575	1.5											

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION									
							SPARK ADVANCE							MAXIMUM						PART THROTTLE								RATER					
OBS NO	LAB NO	MODEL CODE	EM CT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL LVL	OCT NO	TRANS	HARV	GEAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL LVL	CMK N	OCT NO RES	OCT NO MOT	INT	THR	GEAR	RPM	MV
332	46	IC3	P38A4	F Y L	8.0	Y	+15	+15	9380	82	29.52	84	3	80.0	M	4	Y	1575	1.5	L				1								
													2	81.0	M	4	Y	1575	1.5													
													4	L																			
421	26	IC3	P38A4	F Y H	8.0	Y	+15	+15	15393	78	29.80	91	3	86.0	M	3	N	2300	0.9	86.0	3	2300	1.5	1		91.2	82.6	N					
													2	86.0	M	4	Y	1500	0.7													
													4	85.0	M	4	Y	1550	0.7													
422	26	IC3	P38A4	F Y L	8.0	Y	+15	+15	15393	78	29.80	91	3	84.0	M	3	N	2200	0.9					1								
													2	85.0	M	4	Y	1450	0.7													
													4	84.0	M	4	Y	1400	0.7													
423	26	IC3	P38A4	F Y H	8.0	Y	+15	+15	20002	77	29.91	105	3	86.0	M	4	Y	1550	0.8	F				1		92.2	82.8	N					
													2	87.0	M	4	Y	1650	0.8													
													4	82.0	M	4	Y	1450	0.8													
424	26	IC3	P38A4	F Y L	8.0	Y	+15	+15	20002	77	29.91	105	3	85.0	M	4	Y	1450	0.8					1								
													2	85.0	M	2	N	1900	0.5													
													4	78.0	M	4	Y	1550	0.8													
20	29	IGA	238A3	F Y H	8.0	Y	+15	+15	18237	70	30.30	58	3	92.5	P	3	Y	1800	2.5	92.5	3	1800	2.5	1	Y	92.3	86.0	A	M	2	1800	1.1
													2	91.5	M	2	Y	1700	1.2													
													4	89.5	M	2	Y	1800	1.1													
21	29	IGA	238A3	F Y L	8.0	Y	+15	+15	18237	70	30.30	58	3	84.0	M	3	Y	1800	1.2	L				1								
													2	82.0	M	3	Y	2200	1.2													
													4	82.0	M	3	Y	1600	1.2													
62	8	IGA	238A3	F Y H	8.0	Y	+15	+15	21886	80	29.81	45	3	89.0	M	3	Y	1550	1.3	88.0	3	1450	4.0	1				B	M	3	1600	1.3
													2	90.0	M	3	Y	1500	1.3													
													4	87.0	M	3	N	1800	1.7													
63	8	IGA	238A3	F Y H	8.0	Y	+15	+15	8810	80	30.02	84	3	87.0	M	3	Y	1350	1.5	87.0	3	1350	3.0	1				N				
													2	88.0	M	3	Y	1350	1.5													
													4	86.0	M	3	Y	1450	1.5													
94	41	IGA	238A3	C Y H	8.0	Y	+15	+15	18427	74	30.09	60	3	87.0	M	3	Y	1800	2.2	F				1				N				
													2	88.0	M	3	Y	1800	2.2													
													4	85.5	M	3	Y	1800	2.2													
156	47	IGA	238A3	C Y H	8.0	Y	+15	+15	11500	70	29.96	74	3	92.0	M	3	Y	1600	0.8	F				1								
													2	93.0	M	3	Y	1800	0.8													
													4	91.0	M	3	Y	1700	0.8													
443	46	IGA	238A3	F Y H	8.0	Y	+12	+15	17980	74	29.95	54	3	87.0	M	3	N	1825	0.5	F				1	N			B	M	3	1650	0.5
													2	88.0	M	3	N	1625	0.5													
													4	86.0	M	2	N	1850	0.5													
444	46	IGA	238A3	F Y L	8.0	Y	+12	+15	17980	74	29.95	54	3	L						L				1								
													2	78.0	M	3	N	1950	0.5													
													4	L																			

		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION									
							SPARK ADVANCE								MAXIMUM				PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	GTHR	GAIN	CODE	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWNK	OCT RES	OCT MOT	RATER NIT	RATER TRR	RATER GEAR	RPM	MV
186	7	IGY 450A3	F	N	8.0	Y	+20	+20	6280	71	30.21	50	3	86.0	M	3	Y	1500	1.5	84.0	3	1550	2.5	1	N	97.9	96.5	N				
													2	90.0	M	3	Y	1450	1.5											
													4	84.0	M	2	N	2200	1.0											
399	6	IGY 450A3	F	N	8.0	Y	+20	+20	13906	32	30.06	18	3	93.0	P	3	Y	1500	9.0	93.0	3	1500	9.0	1								
													2	95.5	P	3	Y	1500	9.0											
													4	90.5	M	2	N	2100	0.8											
268	7	IJO T18A3	F	N	9.0	Y	+ 8	+ 8	6254	70	30.20	53	3	92.0	M	3	Y	2300	1.3	92.0	3	2050	2.3	1	O	97.8	96.9	B	M	2	3200	0.6
													2	95.0	M	3	Y	1950	1.3											
													4	89.0	M	3	Y	2250	1.3											
22	29	IJP T20A3	F	N	9.3	Y	+ 6	+ 6	14984	70	30.28	58	3	87.0	M	2	Y	2600	1.1	84.5	3	1600	0.8	1				N				
													2	90.5	M	2	Y	2800	1.1											
													4	86.5	M	2	Y	2800	1.1											
23	29	INL P30A3	F	Y H	9.0	Y			13291	70	30.41	58	3	92.5	M	2	Y	2600	1.1	F				1	Y	92.6	83.1	A	M	2	2700	1.1
													2	92.5	M	2	Y	2500	1.1											
													4	88.5	M	2	Y	2700	1.1											
24	29	INL P30A3	F	Y L	9.0	Y			13219	70	30.41	58	3	89.0	M	2	Y	2600	1.1					1								
													2	89.0	M	2	Y	2600	1.1											
													4	82.0	M	2	Y	2700	1.1											
85	41	INL P30A3	C	Y H	9.0	Y			15029	73	30.10	58	3	91.0	M	3	Y	1800	1.8	F				1	N	92.3	83.8	N				
													2	91.0	M	3	Y	1800	1.8											
													4	89.0	M	3	Y	1800	1.8											
86	41	INL P30A3	C	Y L	9.0	Y			15029	73	30.10	58	3	84.0	M	3	Y	1800	1.8	F				1								
													2	85.0	M	3	Y	1800	1.8											
													4	81.0	M	3	Y	1800	1.8											
232	23	INL P30A3	F	Y H	9.0	Y			11677	26	29.49		3	92.0	M	3	Y	1800	1.0	89.0	3	1600	2.0	1				B	M	3	2800	0.4
													2	92.0	M	3	Y	2100	1.0											
													4	92.0	M	3	Y	1800	1.0											
233	23	INL P30A3	F	Y L	9.0	Y			11677	26	29.49		3	88.0	M	3	Y	1900	1.0	88.0	3	1600	2.0	1								
													2	90.0	M	2	N	2800	0.4											
													4	87.0	M	3	Y	1700	1.0											
234	23	INL P30A3	F	Y H	9.0	Y			8824	63	29.11		3	91.0	M	3	Y	1500	0.6	90.0	3	1500	1.5	1				N				
													2	92.0	M	3	Y	1500	0.6											
													4	90.0	M	3	Y	1500	0.6											
235	23	INL P30A3	F	Y L	9.0	Y			8824	63	29.11		3	90.0	M	3	Y	1500	0.6					1								
													2	89.0	M	3	Y	1500	0.6											
													4	89.0	M	3	Y	1500	0.6											
25	29	INU T25A3	F	N	9.0	Y	+ 8	+ 8	11863	70	30.09	58	3	87.0	M	2	Y	3200	1.4	82.0	3	1400	10.0	1	N			N				
													2	91.0	M	2	Y	3000	1.4											
													4	83.0	M	2	Y	2800	1.4											

OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	SPARK ADVANCE AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM TEST	MAXIMUM HARD	MAXIMUM GEAR	MAXIMUM CONV	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	OWK FUEL	OWK OK	RATER OCT RES	RATER OCT MOT	RATER INT	RATER GEAR	RATER HARD	RATER RPM	RATER MV
400	6	INU	T25A3	F N	9.0	Y	+ 8	+ 8	8913	44	29.98	33	3	94.0	M	3	Y	1400	2.0	91.0	3	1400	4.0	1	N	92.7	82.6	N					
													2	96.0	M	3	Y	1350	2.2														
													4	86.0	M	3	Y	1550	1.8														
436	46	KED	T22A3	F N	9.0	Y	+14	+12	19950	84	29.41	110	3	86.0	M	3	N	2100	0.5	83.5	3	1800	1.5	1	N			N					
													2	88.0	M	3	N	2100	0.5														
													4	85.0	M	3	N	2050	0.5														
122	28	KHD	T22A3	F N	9.0	Y	+12	+12	10671	70	29.09	50	3	86.0	M	2	N	2100	0.5	82.0	3	1850	2.0	1				N					
													2	87.0	M	2	N	2200	0.5														
													4	84.0	M	2	N	2300	0.5														
316	40	KHD	T22A3	F N	9.0	Y	+12	+12	8860	50	29.40	38	3	94.5	M	2	N	2400	0.0	F				1				A	M	2	2250	0.0	
													2	96.5	M	2	N	2250	0.0														
													4	91.5	M	2	N	2400	0.0														
386	6	KHD	T22A3	F M	9.0	Y	+12	+12	12334	29	29.89	15	3	93.0	M	3	N	2000	1.4	92.0	3	2000	2.5	1									
													2	94.0	M	3	N	2000	1.4														
													4	91.0	M	3	N	2000	1.4														
40	8	KHE	TP22A3	A Y H	8.1	Y	+12	+12	6895	73	29.29	67	3	90.0	M	3	N	2450	3.0	89.0	3	2350	1.0	1				B	M	3	2550	3.0	
													2	90.0	M	3	N	2500	3.0														
													4	88.0	M	3	N	2350	3.0														
41	8	KKC	222A3	F N	9.0	Y	+10	+10	22194	80	30.19	37	3	90.0	M	3	N	2450	2.0	90.0	3	2250	5.0	1				B	M	3	2500	2.0	
													2	91.0	M	3	N	2450	2.0														
													4	84.0	M	3	N	2400	2.0														
70	41	KKC	222A3	C N	9.0	Y	+10	+10	21270	75	30.10	57	3	88.0	M	3	N	2800	1.8	F				1				N					
													2	88.0	M	3	N	2800	1.8														
													4	86.0	M	3	N	2800	1.8														
3	29	KKD	T22A3	F N	9.0	Y	+ 6	+ 6	10431	70	29.98	56	3	89.0	M	3	N	2000	1.1	F				1	N			N					
													2	92.0	M	3	N	2000	1.1														
													4	86.0	M	3	N	2000	1.1														
341	60	KKD	T22A3	F N	9.0	Y	+12	+12	9636	72	30.54	58	3	92.0	M	2	N	2650	0.8	91.0	3	2400	2.0	1	0	92.1	81.9	A	M	2	2900	0.8	
													2	95.0	M	2	N	2800	0.8														
													4	89.0	M	3	N	2400	1.0														
387	6	KL8	222M5	F Y H	9.0	Y	+15	+15	11604	49	29.79	44	3	97.0	P	4	N	2200	1.8	97.0	4	2200	1.8	1				B	M	3	2200	0.7	
													2	97.0	M	3	N	2200	0.7														
													4	95.0	M	4	N	2200	0.7														
388	6	KL8	222M5	F Y L	9.0	Y	+15	+15	11604	49	29.79	44	3	96.0	P	4	N	2200	1.8	96.0	4	2200	1.8	1									
													2	96.0	M	3	N	2200	0.7														
													4	94.0	M	4	N	2200	0.7														
176	7	KLA	216M4	F N	8.8	N	+12	+12	10635	72	30.47	64	3	89.0	M	4	N	1500	0.3	87.0	4	1300	2.0	1	N	92.8	82.3	N					
													2	92.0	M	4	N	1600	0.3														
													4	85.0	M	4	N	2100	0.3														

OBS NO	LAB NO	MODEL CODE	EMC T	KNK SEN	C.R.	SPARK ADVANCE AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM GT HAR	MAXIMUM COV	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	QUAL FUEL	QUAL MK N	RATER OCT NO RES	RATER OCT NO MOT	RATER INT	RATER THR	RATER GEAR	RATER RPM	RATER MV
42	8	KLC 222A3	A	N	9.0	Y	+10	+10	22851	79	29.29	52	3	89.0	M	3	N 2300	3.0	89.0	3	2100	6.0	1				N				
													2	90.0	M	3	N 2300	3.0													
													4	85.0	M	2	N 2700	0.8													
371	6	KLC 222M5	F	N	9.0	Y	+10	+10	12500	72	30.01	86	3	93.0	P	4	N 2200	7.0	93.0	4	2200	7.0	1	0	93.6	83.4	N				
													2	97.0	P	4	N 2000	7.0													
													4	91.0	M	4	N 1700	0.4													
238	23	LA3 P38A4	F	Y	H	8.0	Y	+13	+15	22739	44	30.20	32	3	91.0	M	4	Y 1400	0.3	F			1				B	M	4	1300	0.3
													2	92.0	M	4	Y 1400	0.3													
													4	86.0	M	4	Y 1350	0.3													
239	23	LA3 P38A4	F	Y	L	8.0	Y	+13	+15	22739	44	30.20	32	3	84.0	M	4	Y 1400	0.3				1								
													2	84.0	M	4	Y 1300	0.3													
													4	83.0	M	4	Y 1400	0.3													
269	7	LA3 P38A4	F	Y	H	8.0	Y	+15	+15	6682	68	30.29	58	3	88.0	M	4	Y 1100	0.8	86.0	4	1000	2.0	1	N	93.0	83.1	B	M	4	1200	0.8
													2	91.0	M	4	Y 1100	0.8													
													4	87.0	M	4	Y 1000	0.8													
26	29	LAE 230A3	F	Y	H	8.4	Y	+15	+15	30637	70	30.28	56	3	90.0	M	3	Y 2300	1.4	88.5	3	1600	2.5	1		92.8	83.6	A	P	3	1700	2.5
													2	92.5	P	3	Y 1650	2.5													
													4	86.5	P	3	Y 1600	2.5													
27	29	LAE 230A3	F	Y	L	8.4	Y	+15	+15	30637	70	30.28	56	3	80.0	M	3	Y 2400	1.4				1								
													2	82.0	M	3	Y 2400	1.4													
													4	L																	
187	7	LAE 230A3	F	Y	H	8.4	Y	+15	+15	28702	72	30.34	58	3	92.0	M	3	Y 1300	0.8	90.0	3	1300	2.0	1	N	93.3	83.2	B	M	3	1300	0.8
													2	94.0	M	3	N 2000	1.1													
													4	90.0	M	3	Y 1100	0.8													
236	23	LAE 230A3	F	Y	H	8.4	Y	+15	+15	10059	46	29.02		3	88.0	M	3	Y 1600	0.8	84.0	3	1600	2.0	1				N				
													2	89.0	M	3	Y 1600	0.8													
													4	86.0	M	3	Y 1600	0.8													
237	23	LAE 230A3	F	Y	L	8.4	Y	+15	+15	10059	46	29.02		3	84.0	M	3	Y 1600	0.8				1								
													2	84.0	M	3	Y 1600	0.8													
													4	82.0	M	3	Y 1600	0.8													
333	46	LAE 230A3	F	Y	H	8.4	Y	+15	+15	13050	80	29.51	82	3	78.0	M	3	N 2425	1.0	78.0	3	2175	2.0	1	N			N				
													2	80.0	M	3	N 2350	1.0													
													4	78.0	M	3	N 2325	1.0													
334	46	LAE 230A3	F	Y	L	8.4	Y	+15	+15	13050	80	29.51	82	3	L					L			1								
													2	L																	
													4	L																	
302	5	LAR T25A3	F	N		9.0	Y	+ 8	+ 8	6324	72	30.34	53	3	91.0	M	3	Y 1900	1.8	F			1	N		95.3	85.1	N				
													2	92.0	M	3	Y 1650	1.8													
													4	88.0	M	3	Y 1850	2.0													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
							SPARK ADVANCE						MAXIMUM						PART THROTTLE								RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	GTHR	GEAR	CONV	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OK	OCT RES	OCT NO	INT	GTHR	RPM	MV
445	46	LAR	T25A3	F N	9.0	Y	+11	+ 8	18740	80	29.61	64	3	84.0	M	3	Y	1750	1.0	F			1	N			M			
													2	85.5	M	3	Y	1500	1.0										
													4	82.0	M	3	Y	1750	1.0										
240	23	LBY	450A4	F N	8.0	Y	+20	+20	16558	48	29.28		3	93.0	M	2	N	2700	0.8	90.0	4	1500	4.0	1				B	M	3 2700	0.8
													2	93.0	M	3	N	2600	0.4										
													4	90.0	M	3	N	2600	0.8										
303	5	LBY	450A4	F N	8.0	Y	+20	+20	21109	68	30.33	55	3	95.0	M	2	N	3000	1.0	F			1	N	97.2	89.0	A	M	2	2950	1.0
													2	97.0	M	2	N	3000	1.0										
													4	91.0	M	2	N	2150	1.0										
425	26	LBY	450A4	F N	8.0	Y	+20	+20	7696	71	30.18	73	3	90.0	M	4	Y	1200	3.0	89.0	4	1225	4.0	1	N	95.9	84.3	N			
													2	90.0	M	4	Y	1225	3.0										
													4	87.0	M	3	N	2000	1.5										
87	41	LBY	450A4	C Y H	8.0	Y	+20	+20	13902	68	30.16	57	3	95.0	M	3	N	2100	1.4	F			1				B	M	3	2100	1.4
													2	95.0	M	3	N	2100	1.4										
													4	91.0	M	3	N	2100	1.4										
88	41	LBY	450A4	C Y L	8.0	Y	+20	+20	13902	68	30.16	57	3	84.0	M	3	N	2100	1.4				1								
													2	84.0	M	3	N	2100	1.4										
													4	82.0	M	3	N	2100	1.4										
132	28	LC3	P38A4	F Y H	8.0	Y	+15	+15	10524	70	29.28	50	3	90.0	M	4	Y	1300	2.0	F			1					N			
													2	90.0	M	4	Y	1100	2.0										
													4	87.0	M	4	Y	1400	2.0										
133	28	LC3	P38A4	F Y L	8.0	Y	+15	+15	10524	70	29.28	50	3	88.0	M	4	Y	1200	2.0	F			1								
													2	88.0	M	4	Y	1100	2.0										
													4	86.0	M	4	Y	1350	2.0										
134	28	LC3	P38A4	F Y H	8.0	Y	+15	+15	9711	70	29.28	50	3	87.0	M	4	Y	1250	1.5	F			1					N			
													2	87.0	M	4	Y	1200	1.5										
													4	96.0	M	4	Y	1300	1.5										
135	28	LC3	P38A4	F Y L	8.0	Y	+15	+15	9711	70	29.28	50	3	85.0	M	4	Y	1200	1.5	F			1								
													2	86.0	M	4	Y	1200	1.5										
													4	84.0	M	4	Y	1300	1.5										
136	28	LC3	P38A4	F Y H	8.0	Y	+15	+15	10321	70	29.19	50	3	91.0	M	4	Y	1350	1.2	F			1					N			
													2	91.0	M	4	Y	1300	1.2										
													4	91.0	M	4	Y	1300	1.2										
137	28	LC3	P38A4	F Y L	8.0	Y	+15	+15	10321	70	29.19	50	3	89.0	M	4	Y	1200	1.2	F			1								
													2	90.0	M	4	Y	1150	1.2										
													4	89.0	M	4	Y	1200	1.2										
157	47	LC3	P38A4	C Y H	8.0	Y	+15	+15	7400	70	30.01	50	3	88.0	M	4	Y	1300	1.0	84.0	4	1300	2.5	1							
													2	88.0	M	4	Y	1300	1.0										
													4	85.0	M	4	Y	1300	1.0										

OBS NO	LAB NO	MODEL CODE	VEHICLE DESCRIPTION: EM CT	KNK SEN	C.R.	SPARK ADVANCE: AIR	AS RCD	AS TST	ODOM MILES	WEATHER: AMB TMP	BAROM	HUM	FUEL	MAXIMUM: OCT NO	GTR	GEAR	GCON	RPM	MV	PART THROTTLE: OCT NO	GEAR	RPM	MV	FUEL	OAK	RATER: OCT RES	OCT MOT	NIT	GTR	GEAR	RPM	MV
158	47	LC3	P38A4	C	Y	L	8.0	Y	+15	+15	7400	70	30.01	50	3	86.0	M	4	Y	1300	1.0	82.0	4	1300	2.5	1								
															2	86.0	M	4	Y	1300	1.0											
															4	84.0	M	4	Y	1300	1.0											
241	23	LC3	P38A4	F	Y	H	8.0	Y	+15	+15	11408	54	30.03	34	3	78.0	M	4	Y	1300	1.0	78.0	4	1300	2.0	1			N				
															2	78.0	M	4	Y	1300	1.0											
															4	L																	
242	23	LC3	P38A4	F	Y	L	8.0	Y	+15	+15	11408	54	30.03	34	3	L										1							
															2	L																	
															4	L																	
426	26	LC3	P38A4	F	Y	H	8.0	Y	+15	+15	12762	71	30.16	69	3	86.5	M	2	N	1400	0.8	84.5	4	1600	1.8	1	N	94.3	82.3	N				
															2	88.0	M	2	N	1900	0.8											
															4	85.0	M	4	Y	1600	0.8											
427	26	LC3	P38A4	F	Y	L	8.0	Y	+15	+15	12762	71	30.16	69	3	86.5	M	2	N	1400	0.8					1							
															2	88.0	M	2	N	1900	0.8											
															4	85.0	M	4	Y	1600	0.8											
446	46	LEY	450A4	F	N		8.0	Y	+20	+20	8856	84	29.55	100	3	84.0	M	4	Y	1125	3.0	83.0	4	1300	4.0	1	N			N				
															2	83.0	M	4	Y	1350	3.0											
															4	78.0	M	4	Y	1250	3.0											
188	7	LGA	238A3	F	Y	H	8.0	Y	+15	+15	6458	74	30.41	55	3	86.0	M	3	N	1500	1.1	F				1	N	92.3	82.5	N				
															2	90.0	M	3	N	1600	1.1											
															4	80.0	M	2	N	1500	0.9											
244	23	LGA	238A3	F	Y	L	8.0	Y	+13	+15	21675	35	30.33	22	3	88.0	M	3	Y	1000	1.0					1							
															2	88.0	M	3	Y	900	1.0											
															4	87.0	M	3	Y	1200	1.0											
243	23	LGA	238A3	F	Y	H	8.0	Y	+13	+15	21675	35	30.33	22	3	94.0	M	3	Y	1300	0.5	93.0	3	850	2.0	1				B	M	3	900	1.0
															2	95.0	M	3	Y	900	1.0											
															4	93.0	M	3	Y	1200	1.0											
304	5	LGA	238A3	F	Y	H	8.0	Y	+14	+14	11053	69	30.05	58	3	91.0	M	2	N	1800	1.4	F				1	N	98.0	86.8	N				
															2	93.0	M	2	N	2100	1.4											
															4	89.0	M	2	N	2000	1.4											
305	5	LGA	238A3	F	Y	L	8.0	Y	+14	+14	11053	69	30.05	58	3	88.0	M	2	N	2150	1.4					1							
															2	91.0	M	2	N	2050	1.4											
															4	86.0	M	2	N	2000	1.4											
380	6	LGA	238A3	F	Y	H	8.0	Y	+15	+15	12505	58	30.45	34	3	91.0	M	3	N	1800	0.4	F				1	N	93.3	82.2	B	M	2	2300	0.4
															2	92.0	M	3	N	1800	0.4											
															4	89.0	M	3	Y	1100	0.4											
381	6	LGA	238A3	F	Y	L	8.0	Y	+15	+15	12505	58	30.45	34	3	86.0	M	3	N	1700	0.4					1							
															2	87.0	M	3	N	1800	0.4											
															4	86.0	M	3	Y	1100	0.4											

		VEHICLE DESCRIPTION								WEATHER				OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION									
														MAXIMUM							PART THROTTLE								RATER			
							SPARK ADVANCE																									
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	GTHR	GEAR	CONV	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK	OCT NO RES	OCT NO MOT	NITR	GTHR	GEAR	RPM	MV
245	23	LJO	T18M5	F N	9.0	Y	+10	+ 8	9446	46	29.02	38	3	95.0	M	4	N	1200	0.1	95.0	4	1200	1.0	1			A	M	4	1100	0.1
													2	96.0	M	4	N	1200	0.1												
													4	95.0	M	4	N	1200	0.1												
382	6	LJP	T20A3	F N	9.3	Y	+ 6	+ 6	11198	54	30.01	33	3	90.0	M	2	N	3900	0.6	F				1	N	97.5	87.5	N				
													2	93.0	M	2	N	4000	0.6												
													4	87.0	M	3	N	2700	0.4												
28	29	LNL	P30A3	F Y H	9.0				9528	70	30.10	58	3	96.5	P	3	Y	1800	9.0	96.5	3	1800	9.0	1		92.5	86.3	A	P	3	2000	7.0
													2	100.5	P	3	Y	1700	8.0												
													4	89.0	M	3	Y	2700	1.4												
29	29	LNL	P30A3	F Y L	9.0				9528	70	30.10	58	3	91.0	P	3	Y	1800	8.0	91.0	3	1800	8.0	1								
													2	95.0	P	2	Y	1700	7.0												
													4	84.0	M	2	Y	2700	1.4												
89	41	LNL	P30A3	C Y H	9.0	Y			23641	73	30.03	56	3	95.0	M	3	Y	1700	1.8	F				1				B	M	3	1700	1.8
													2	95.0	M	3	Y	1700	1.8												
													4	95.0	M	3	Y	1700	1.8												
90	41	LNL	P30A3	C Y L	9.0	Y			23641	73	30.03	56	3	86.0	M	3	Y	1700	1.8					1								
													2	87.0	M	3	Y	1700	1.8												
													4	85.0	M	3	Y	1700	1.8												
138	28	LNL	P30A3	F Y H	9.0	Y			10436	70	29.37	50	3	88.0	M	2	N	2200	0.5	F				1				N				
													2	89.0	M	2	N	2200	0.5												
													4	86.0	M	2	N	2300	0.5												
139	28	LNL	P30A3	F Y L	9.0	Y			10436	70	29.37	50	3	87.5	M	2	N	2100	0.5	F				1								
													2	88.0	M	2	N	2100	0.5												
													4	85.0	M	2	N	2300	0.5												
257	41	LNL	P30A3	C Y H	9.0	Y			11643	69	30.32	55	3	94.0	M	3	Y	1650	1.6	F				1				B	M	3	1650	1.6
													2	94.0	M	3	Y	1650	1.6												
													4	93.0	M	3	Y	1650	1.6												
258	41	LNL	P30A3	C Y L	9.0	Y			11643	69	30.32	55	3	96.0	M	3	Y	1650	1.6					1								
													2	87.0	M	3	Y	1650	1.6												
													4	84.0	M	3	Y	1650	1.6												
323	40	LNL	P30A3	F Y H	9.0	N			13980	60	29.97	50	3	86.5	M	3	Y	1750	2.0	F				1				N				
													2	85.0	M	3	Y	1650	2.0												
													4	86.0	M	3	Y	1800	2.0												
324	40	LNL	P30A3	F Y L	9.0	N			13980	60	29.97	50	3	86.5	M	3	Y	1700	2.0	F				1								
													2	85.0	M	3	Y	1600	2.0												
													4	86.0	M	3	Y	1800	2.0												
140	28	LNU	T25A3	F N	9.0	Y	+10	+10	10278	70	29.32	50	3	87.0	M	2	N	2500	1.0	85.0	3	1450	3.0	1				N				
													2	87.0	M	2	N	2550	1.0												
													4	86.0	M	2	N	2550	1.0												

OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM AIR	MAXIMUM EGR	MAXIMUM CON	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE AIR	PART THROTTLE RPM	PART THROTTLE MV	FUEL OMK	FUEL GRADE	RATER OCT NO RES	RATER OCT NO MOT	RATER INT	RATER THR	RATER GEAR	RATER RPM	RATER MV
270	7	LNU	T25A3	F N	9.0	Y	+ 8	+ 8	7758	68	30.09	56	3	96.0	M	3	Y	1500	2.0	96.0	3	1300	4.0	1	N	93.1	82.4	A	M	2	3400	1.5
													2	98.0	M	2	N	3000	1.5														
													4	87.0	M	2	N	2900	1.5														
64	8	LXR	T25A3	F N	9.0	Y	+ 8	+ 8	8998	80	29.88	74	3	92.0	M	3	Y	1800	2.5	88.0	3	1850	4.0	1				B	M	3	1700	2.5
													2	93.0	M	3	Y	1800	2.5														
													4	88.0	M	3	Y	1800	2.5														
271	7	LXR	T25A3	F N	9.0	Y	+ 8	+ 8	10577	71	30.36	45	3	96.0	M	3	Y	1700	1.4	96.0	3	1400	3.0	1	Y	98.0	87.0	B	M	3	2000	1.4
													2	99.0	M	3	Y	1550	1.4														
													4	92.0	M	3	Y	1800	1.4														
335	46	LXR	T25A3	F N	9.0	Y	+12	+ 8	19147	75	29.10	104	3	84.0	M	3	N	2400	1.0	80.0	3	2300	2.0	1	N			N				
													2	86.0	M	3	N	2300	1.0														
													4	84.0	M	3	N	2700	1.0														
342	60	LXW	P28A3	F N	8.9	Y	+10	+10	6451	70	30.18	58	3	87.0	M	3	Y	1450	1.8	86.0	3	1300	3.0	1	N	93.3	82.1	B	M	3	2350	1.3
													2	90.0	M	3	Y	1600	1.8														
													4	87.0	M	2	N	2300	1.1														
107	32	ME4	216A3	F N	9.0	Y	+14	+14	9049	85	29.44	64	3	93.0	P	3	N	1300	3.0	93.0	3	1300	3.0	1	N	93.6	82.6	B	P	3	1400	3.0
													2	93.0	M	3	N	1275	1.3														
													4	92.0	P	3	N	1300	3.0														
198	32	ME4	216A3	F N	9.0	Y	+14	+14	10433	85	29.29	64	3	89.0	M	3	N	1375	1.3	89.0	3	1300	3.0	1	N	91.0	82.1	B	M	3	2200	0.7
													2	91.0	M	3	N	1300	1.3														
													4	89.0	M	3	N	1250	1.3														
179	7	ME4	216A3	F N	9.0	Y	+14	+14	12461	73	30.10	70	3	94.0	M	3	N	1900	1.2	94.0	3	1300	4.0	1	Y	92.7	82.2	B	M	2	2100	1.0
													2	96.0	M	3	N	2100	1.2														
													4	91.0	M	3	N	1900	1.2														
148	32	ME4	216M5	F N	9.0	Y	+10	+10	8585	85	29.15	58	3	91.0	P	4	N	2000	1.2	91.0	4	2000	1.2	1	N	90.5	81.7	B	M	4	2000	0.2
													2	91.0	M	4	N	2000	0.2														
													4	90.0	M	4	N	2200	0.2														
109	32	ML3	T38A3	F N	8.7	Y	+ 7	+ 7	10902	85	29.25	66	3	86.0	M	2	N	3000	1.0	82.0	3	1500	3.0	1	N	91.0	82.2	N				
													2	87.0	M	2	N	3000	1.0														
													4	86.0	M	2	N	3000	1.0														
180	7	ML3	T38A3	F N	8.7	Y	+ 7	+10	10550	72	30.09	65	3	91.0	M	2	N	1800	0.9	F			1										
													2	94.0	M	2	N	2900	0.9														
													4	90.0	M	2	N	1800	0.9														
199	32	ML3	T38A3	F N	8.7	Y	+ 7	+ 7	23674	85	29.41	63	3	91.0	M	2	N	3000	0.8	89.0	3	1600	4.0	1	N	90.4	92.6	B	M	2	2800	0.8
													2	91.0	M	2	N	2800	0.8														
													4	90.0	M	2	N	2000	0.8														
338	47	ML3	T38A3	C N	8.7	Y	+10	+10	13050	70	30.14	50	3	85.0	M	2	N	2500	0.2	82.0	3	1750	1.5	1									
													2	87.0	M	2	N	2500	0.2														
													4	84.0	M	2	N	2350	0.2														

		VEHICLE DESCRIPTION											WEATHER				OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
																	MAXIMUM							PART THROTTLE								RATER							
						SPARK ADVANCE																																	
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	GTHR	GTEA	GCON	RPM	MV	OCT NO	GEAR	RPM	MV	OWK FUEL	OWK KN	OCT RES	OCT MOT	NIT	GTEA HR	RPM	MV
110	32	MPF	T50A4	F	N	8.4	Y	+10	+10	6873	85	29.52	64	3	93.0	M	4	N	1600	1.5	92.0	4	1700	3.0	1	0	93.6	83.1	N			
														2	93.0	M	4	N	1600	1.6										
														4	93.0	M	4	N	1500	1.2										
111	32	MPF	T50A4	F	N	8.4	Y	+ 9	+ 9	10200	85	29.71	63	3	91.0	P	4	N	950	3.0	91.0	4	950	3.0	1	Y	90.1	82.0	B	P	4	1000	3.0
														2	91.0	P	4	N	1000	3.0										
														4	90.0	P	4	N	1000	3.0										
373	6	MPF	T50A4	F	N	8.4	Y	+10	+10	8034	60	30.19	49	3	89.0	M	3	N	1800	1.0	88.0	4	1400	2.4	1							
														2	91.0	M	2	N	3100	1.6										
														4	89.0	M	4	N	1400	1.0										
46	9	MS3	T38A3	F	N	8.7	Y	+ 7	+ 7	24063	79	29.85	61	3	87.0	M	2	N	2000	0.8	F				1				N			
														2	89.0	M	2	N	2000	0.8										
														4	86.0	M	2	N	2000	0.8										
440	46	MS3	T38A3	F	N	8.7	Y	+10	+ 7	12163	80	29.51	70	3	L						L				1	N			N			
														2	80.0	M	3	N	1850	0.5										
														4	L																	
393	6	MSF	T50A4	F	N	8.4	Y	+10	+10	14761	25	30.28	10	3	94.0	M	3	N	1750	0.6	92.0	4	1400	3.0	1							
														2	95.0	M	3	N	1700	0.6										
														4	94.0	M	3	N	1300	0.6										
439	46	MSF	T50A4	F	N	8.4	Y	+ 8	+ 8	9185	80	29.12	84	3	88.0	M	4	N	1475	1.0	88.0	4	1300	2.0	1	N			N			
														2	89.0	M	4	N	1250	1.0										
														4	87.0	M	4	N	1400	1.0										
73	41	MTX	T23A3	C	N	9.0	Y	+10	+10	7178	73	29.89	62	3	93.0	M	3	N	1800	1.5	89.0	3	1800	2.5	1				B	M	3	1800	1.5
														2	93.0	M	3	N	1800	1.5										
														4	90.0	M	3	N	1800	1.5										
112	32	MTX	T23A3	F	N	9.0	Y	+10	+10	7522	85	29.95	66	3	87.0	M	3	N	2100	0.8	86.0	3	1700	2.0	1	N	91.2	81.8	N			
														2	88.0	M	3	N	2000	0.7										
														4	86.0	M	3	N	1800	0.8										
113	32	MTX	T23A3	F	N	9.0	Y	+10	+10	17450	85	29.64	64	3	92.0	M	3	N	1400	1.6	91.0	3	1400	3.0	1	0	94.3	82.6	N			
														2	91.0	M	3	N	1400	1.6										
														4	92.0	M	3	N	1400	1.6										
351	62	MTX	T23A3	F	N	9.0	Y	+10	+10	9625	68	30.36	48	3	93.0	M	3	N	1900	1.3	93.0	3	1600	4.0	1	0	94.0	82.9	A	M	3	2100	1.3
														2	94.0	M	3	N	2000	1.3										
														4	92.0	M	3	N	2000	1.3										
114	32	MTX	T23M5	F	N	9.0	Y	+10	+10	3873	85	29.34	66	3	91.0	M	4	N	3000	1.1	91.0	4	2000	2.0	1	0	91.0	82.3	B	P	4	1500	2.0
														2	93.0	M	4	N	2000	0.7										
														4	90.0	M	4	N	2200	0.7										
172	41	MTX	T23M5	C	N	9.0	Y	+10	+10	9036	65	30.18	70	3	86.0	M	4	N	2200	0.4	85.0	4	2200	1.5	1	N	91.8	84.2	N			
														2	87.0	M	4	N	2200	0.4										
														4	84.0	M	4	N	2200	0.4										

OBS NO	LAB NO	VEHICLE DESCRIPTION: MODEL CODE	EM CT	KNK SEN	SPARK ADVANCE: A I R	C.R.	AS RCD	AS TST	ODOM MILES	WEATHER: AMB TMP	BAROM	HUM	FUEL	OCTANE NUMBER REQUIREMENT DATA: MAXIMUM: OCT NO	SC TE HR	AV	RPM	MV	PART THROTTLE: OCT NO	GEAR	RPM	MV	FUEL	OWK EN	TANK FUEL INFORMATION: RATER: OCT NO RES	OCT NO MOT	INT TR	GEAR	RPM	MV
75	41	NAR T25A3	C	N	Y	9.0	+ 8	+ 8	7812	76	30.05	56	3	94.5	M 3	Y	1700	2.4	F				1			A	M	3	1700	2.4
													2	95.0	M 3	Y	1700	2.4											
													4	93.0	M 3	Y	1700	2.4											
288	5	NAR T25A3	F	N	Y	9.0	+ 8	+ 8	10580	69	29.55	54	3	91.0	M 3	Y	1450	1.8	F				1			A	M	3	1450	2.0
													2	91.5	M 3	Y	1550	2.0											
													4	88.0	M 3	Y	1625	1.9											
4	29	NAW P28A3	F	N	Y	8.9	+10	+10	6100	70	30.10	58	3	83.0	M 2	Y	2500	1.4	79.0	3	2000	5.0	1			N				
													2	86.0	M 3	Y	2300	1.4											
													4	82.0	M 2	Y	2400	0.8											
154	47	NAW P28A4	C	N	Y	8.9	+10	+10	6000	70	30.11	50	3	84.5	M 3	Y	3000	0.5	F				1							
													2	85.5	M 3	Y	3400	0.5											
													4	84.0	M 3	Y	2900	0.5											
361	47	NAW P28A4	C	N	Y	8.9	+10	+10	6120	70	30.26	41	3	84.5	M 3	N	2500	0.2	F				1							
													2	87.0	M 2	N	3600	0.0											
													4	84.0	M 2	N	3500	0.0											
375	6	NAW P28A4	F	N	Y	8.9	+11	+10	7150	58	29.93	34	3	90.0	M 2	N	3900	1.0	F				1	N	97.2 87.5	N				
													2	93.0	M 2	N	4000	1.0											
													4	88.0	M 2	N	3700	1.0											
5	29	NAX 228A3	F	N	Y	8.5	+10	+10	16319	70	30.41	58	3	91.0	M 2	Y	2250	1.2	90.5	3	1300	8.0	1		92.3 86.6	B	P	3	1300	8.0
													2	92.0	M 2	Y	2300	1.2											
													4	88.5	M 2	Y	2200	1.2											
47	8	NAX 228A3	F	N	Y	8.5	+10	+10	15764	79	30.08	52	3	90.0	M 3	Y	1600	2.5	90.0	3	1550	5.0	1			N				
													2	91.0	M 3	Y	1600	2.5											
													4	87.0	M 3	Y	1600	2.5											
48	8	NAX 228A3	F	N	Y	8.5	+10	+10	16986	78	29.88	44	3	90.0	M 3	Y	1400	3.2	88.0	3	1350	4.5	1			B	M	3	1400	3.2
													2	90.0	M 3	Y	1400	3.2											
													4	88.0	M 3	Y	1450	3.2											
181	7	NAX 228A3	F	N	N	8.5	+10	+10	15365	72	30.14	58	3	94.0	M 3	Y	1150	2.6	94.0	3	1150	3.6	1	0	92.2 82.0	A	M	2	2700	1.0
													2	96.0	M 3	Y	1750	2.6											
													4	88.0	M 3	Y	1250	2.6											
289	5	NAX 228A3	F	N	Y	8.5	+ 8	+ 8	18322	67	30.30	60	3	88.0	M 3	Y	1500	2.8	87.0	3	1500	4.0	1							
													2	90.0	M 2	N	1800	1.4											
													4	86.0	M 3	Y	1525	2.8											
213	23	NAX 228A4	F	N	Y	8.5	+11	+10	14991	55	30.18	47	3	90.0	M 2	N	2400	0.6	90.0	4	1300	2.0	1			N				
													2	91.0	M 2	N	2300	0.6											
													4	89.0	M 4	Y	1300	1.0											
6	29	NBH 450A4	F	Y	H	9.5	Y	0	0	14766	70	30.38	56	3	96.0	M 4	Y	1900	1.2	95.0	4	1200	6.0	1		92.7 86.5	A	P	4	1200	7.0
													2	97.5	M 4	Y	1800	1.2											
													4	92.5	M 3	Y	1800	1.2											

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION								
							SPARK ADVANCE										MAXIMUM				PART THROTTLE						RATER					
OBS NO	LAB NO	MODEL CODE	ENG CT	KNK SEN	C.R.	AIR	ASCD	ASTST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	TH	GR	TC	ON	RPM	MV	OCT NO	SEAR	RPM	MV	FUEL	OAK	OCT RES	OCT MOT	NIT	THR	GEAR	RPM	MV
49	8	NBH 450A4	F	Y H	9.5	Y	0	0	8484	80	30.10	64	3	93.0	M	2	N	3050	1.0	90.0	4	1000	3.0	1				B	M	2	2800	1.0
													2	94.0	M	2	N	3150	1.0													
													4	92.0	M	3	N	1900	1.5													
214	23	NBH 450A4	F	Y H	9.5	Y	+ 2	0	10211	57	29.19		3	92.0	M	2	N	2400	1.0	92.0	4	1100	2.0	1				B	M	4	1100	1.0
													2	93.0	M	2	N	2400	1.0													
													4	91.0	M	4	Y	1100	1.2													
215	23	NBH 450A4	F	Y L	9.5	Y	+ 2	0	10211	57	29.19		3	89.0	M	4	Y	1100	1.2					1								
													2	90.0	M	4	Y	1100	1.2													
													4	88.0	M	4	Y	1100	1.2													
263	7	NBH 450A4	F	Y H	9.5	Y	0	0	18218	70	30.46	44	3	98.0	M	2	N	2300	1.2	98.0	4	1200	2.0	1	Y	93.4	83.2	A	M	2	3300	1.2
													2	100.0	M	2	N	3300	1.2													
													4	95.0	M	4	Y	1100	0.8													
376	6	NBH 450A4	F	Y H	9.5	Y	+ 5	0	6447	64	30.28	71	3	101.0	M	3	N	2100	0.9					1	N	97.8	85.3	A	M	4	1200	1.2
													2	101.5	M	2	N	2700	0.9													
													4	H	M	2	N	2300	0.9													
377	6	NBH 450A4	F	Y L	9.5	Y	+ 5	0	6447	64	30.28	71	3	100.0	M	3	N	2100	0.9					1								
													2	101.5	M	2	N	2700	0.9													
													4	99.0	M	2	N	2300	0.9													
394	6	NBH 450A4	F	Y H	9.5	Y	0	0	16995	34	30.29	15	3	98.0	M	4	Y	1200	0.6					1	N	98.8	87.4	A	M	4	1100	0.6
													2	99.0	M	2	N	2800	1.0													
													4	97.0	M	4	Y	1200	0.6													
395	6	NBH 450A4	F	Y L	9.5	Y	0	0	16995	34	30.29	15	3	98.0	M	4	Y	1200	0.6					1								
													2	99.0	M	2	N	2800	1.0													
													4	97.0	M	4	Y	1200	0.6													
50	8	NBZ T43A3	F	Y H	9.3	Y	0	0	6338	76	30.35	31	3	84.0	M	3	N	1950	1.0	F				1				N				
													2	84.0	M	3	N	2100	1.0													
													4	82.0	M	3	N	1950	1.0													
51	8	NBZ T43A3	F	Y H	9.3	Y	0	0	6454	75	29.84	37	3	86.0	M	3	N	2100	1.0	84.0	3	1150	9.0	1				N				
													2	87.0	M	3	N	2150	1.0													
													4	84.0	M	3	N	2100	1.0													
410	26	NBZ T43A3	F	Y H	9.3	Y	0	0	7752	80	29.84	152	3	85.0	M	3	Y	1575	0.7	F				1		91.2	82.6	N				
													2	85.0	M	3	N	1675	0.4													
													4	82.0	M	3	Y	1325	0.7													
411	26	NBZ T43A3	F	Y L	9.3	Y	0	0	7752	80	29.84	152	3	82.0	M	3	N	2100	0.3	F				1								
													2	82.0	M	3	N	1650	0.4													
													4	80.0	M	3	Y	1350	0.7													
412	26	NBZ T43A3	F	Y H	9.3	Y	0	0	7104	78	30.32	87	3	88.0	M	2	N	1825	0.2	F				1		91.2	92.6	B	M	2	1800	0.2
													2	88.0	M	3	Y	1800	0.7													
													4	92.0	M	3	Y	1250	0.2													

OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM GTEC HRAV	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	OWNER FUEL	OWNER KNK	RATER OCT NO RES	RATER OCT NO MOT	RATER INT	RATER GEAR	RATER RPM	RATER MV
413	26	NBZ T43A3	F	Y L	9.3	Y	0	0	7104	78	30.32	87	3	84.0	M 2 N	1300	0.7					1							
													2	84.0	M 3 Y	1300	0.7												
													4	82.0	M 3 Y	1330	0.7												
129	28	NBZ T43A4	F	Y H	9.3	Y	0	0	10411	70	29.18	50	3	86.0	M 4 Y	1200	1.5	F				1				N			
													2	86.0	M 4 Y	1100	1.5												
													4	84.0	M 4 Y	1100	1.5												
130	28	NBZ T43A4	F	Y L	9.3	Y	0	0	10411	70	29.18	50	3	84.0	M 4 Y	1000	1.5	F				1							
													2	84.0	M 4 Y	1050	1.5												
													4	81.0	M 4 Y	1000	1.5												
216	23	NFH 450A4	F	Y H	9.5	Y	+2	0	7655	52	30.12	43	3	93.0	M 4 Y	1100	0.8	93.0	4	1100	2.0	1				N			
													2	94.0	M 3 N	2000	1.8												
													4	91.0	M 4 Y	1100	0.8												
217	23	NFH 450A4	F	Y L	9.5	Y	+2	0	7655	57	30.12	43	3	88.0	M 4 Y	1100	0.8	88.0	4	1000	5.0	1							
													2	89.0	M 3 N	2000	1.5												
													4	86.0	M 4 Y	1100	0.8												
290	5	NFH 450A4	F	Y H	9.5	Y	0	0	7280	69	30.13	66	3	92.0	M 4 Y	1550	1.3	90.0	4	1500	3.0	1	N	92.5	82.8	B	M 4	1450	1.3
													2	92.0	M 3 N	2250	2.2												
													4	90.0	M 4 Y	1550	1.3												
291	5	NFH 450A4	F	Y L	9.5	Y	0	0	7280	69	30.13	66	3	91.0	M 4 Y	1600	1.3					1							
													2	91.0	M 3 N	2300	2.2												
													4	89.0	M 4 Y	1550	1.3												
328	46	NFH 450A4	F	Y H	9.5	Y	0	0	8863	80	29.53	90	3	88.0	M 4 Y	1250	0.5	87.0	4	1250	1.5	1	N			N			
													2	88.0	M 4 Y	1250	0.5												
													4	86.0	M 4 Y	1250	0.5												
76	41	NFS P28A4	C	N	8.9	Y	+10	+10	14840	76	30.04	58	3	87.0	M 4 Y	1500	2.4	F				1				N			
													2	88.0	M 4 Y	1500	2.4												
													4	86.0	M 4 Y	1400	2.4												
218	23	NFS P28A4	F	N	8.9	Y	+10	+10	14394	38	29.15		3	84.0	M 2 N	3800	0.2	F				1				N			
													2	86.0	M 2 N	3800	0.2												
													4	83.0	M 2 N	3600	0.2												
155	47	N66 450A4	C	Y H	9.5	Y	+8	+6	6500	70	30.08	50	3	H	M 3 Y	2500	1.0	F				1							
													2	H	M 3 Y	3000	1.0												
													4	H	M 3 Y	3000	1.0												
396	6	N66 450A4	F	Y H	9.5	Y	+7	+6	8454	33	30.21	20	3	102.0	M 4 Y	1700	1.8	100.0	4	1800	3.2	1	N	92.5	82.3	A	M 4	1650	1.8
													2	102.0	M 4 Y	1650	1.8												
													4	97.0	M 4 Y	1750	1.8												
7	29	N6Z T43A3	F	Y H	9.3	Y	0	0	12959	70	30.41	58	3	92.0	P 3 Y	1800	2.0	92.0	3	1800	2.0	1		92.2	86.4	A	P 3	1200	8.0
													2	95.0	M 3 Y	1900	0.9												
													4	90.5	M 3 Y	1800	0.9												

OBS NO	LAB NO	MODEL CODE	ENG CONT	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	THR	TEA	CON	RPM	MV	GEA	OCT NO	RPM	MV	FUEL	OCT NO	RES	MOT	RATER INT	RATER THR	RATER GEA	RATER RPM	RATER MV
397	6	NGZ	T43A3	F Y	H	9.3	Y	0	0	11648	38	30.05	33	3	92.0	M	2	N	1850	0.8					1	92.6	82.4	A	M	2	1900	0.8
														2	93.0	M	2	N	1850	0.8											
														4	92.0	M	2	N	1800	0.8											
398	6	NGZ	T43A3	F Y	L	9.3	Y	0	0	11648	38	30.05	33	3	92.0	M	2	N	1800	0.8	F				1							
														2	93.0	M	2	N	1800	0.8											
														4	92.0	M	2	N	1800	0.8											
264	7	NGZ	T43A4	F Y	H	9.3	Y	+ 5	0	6753	73	30.24	54	3	90.0	M	2	N	2200	0.4	F				1	N	93.0	82.8	N			
														2	90.0	M	2	N	2200	0.4											
														4	85.0	M	2	N	2400	0.4											
8	29	NJP	T20A3	F N		9.3	Y	+ 6	+ 6	11225	72	30.10	58	3	87.0	M	3	N	2600	1.0	86.0	3	2700	9.0	1	N			N			
														2	90.0	P	3	N	2700	9.0											
														4	86.5	M	3	N	2600	1.0											
52	8	NJP	T20A3	F N		9.3	Y	+ 6	+ 6	11448	78	29.98	77	3	84.0	M	3	N	2600	1.0	F				1				N			
														2	85.0	M	3	N	2600	1.0											
														4	82.0	M	3	N	2700	1.0											
53	8	NJP	T20A3	F N		9.3	Y	+ 6	+ 6	10782	76	30.20	35	3	88.0	M	2	N	3500	0.5	F				1				N			
														2	89.0	M	2	N	3500	0.5											
														4	86.0	M	2	N	3500	0.5											
77	41	NJP	T20A3	C N		9.3	Y	+ 6	+ 6	16801	70	29.94	59	3	88.0	M	2	N	3800	1.0	F				1				N			
														2	88.0	M	2	N	3800	1.0											
														4	86.0	M	2	N	3800	1.0											
182	7	NJP	T20A3	F N		9.3	Y	+ 6	+ 6	20081	72	30.46	56	3	96.0	M	2	N	3800	0.8	96.0	3	2700	6.0	1	0	93.2	83.0	A	P	3	2100	6.0
														2	98.0	P	3	Y	2700	6.0											
														4	91.0	M	2	N	3600	0.8											
219	23	NJP	T20A3	F N		9.3	Y	+ 4	+ 6	6845	52	29.03		3	89.0	M	3	N	2700	1.0	89.0	3	1550	6.0	1				N			
														2	91.0	M	3	N	2700	1.0											
														4	87.0	M	3	N	2600	1.0											
292	5	NJP	T20A3	F N		9.3	Y	+ 6	+ 6	9390	68	29.97	57	3	90.0	M	2	N	2400	1.0	88.0	3	1600	4.0	1	N	92.2	82.0	N			
														2	91.0	M	2	N	2350	1.0											
														4	86.0	M	2	N	2825	1.0											
329	46	NJP	T20A3	F N		9.3	Y	+ 6	+ 6	7280	80	29.50	90	3	81.0	M	2	N	3250	1.0	L				1	N			N			
														2	82.0	M	2	N	3050	1.0											
														4	80.0	M	2	N	2950	1.0											
339	47	NJP	T20A3	C N		9.3	Y	+ 6	+ 6	15600	70	30.16	50	3	98.0	P	3	Y	1500	9.0	98.0	3	1500	9.0	1							
														2	86.0	M	3	N	2750	0.5											
														4	84.0	M	3	N	2750	0.5											
340	47	NJP	T20A3	C N		9.3	Y	+ 6	+ 6	15800	70	30.20	50	3	98.0	P	3	Y	1500	9.0	98.0	3	1500	9.0	1							
														2	90.0	M	3	N	2750	0.5											
														4	88.0	M	3	N	3000	0.5											

		VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION								
																	MAXIMUM				PART THROTTLE							RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	SPARK ADVANCE AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	THR	AIR	VAR	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OCT NO RES	OCT NO MOT	KNK INT	THR	GEAR	RPM	MV
414	26	NJP	T20A3	F N	9.0	Y	+ 6	+ 6	13952	76	30.07	112	3	81.0	M	2	N	3450	0.4	L			1	94.1	83.3	N				
													2	82.0	M	2	N	3550	0.4											
													4	78.0	M	2	N	3500	0.4											
220	23	NJW	P28A3	F N	8.9	Y	+10	+10	6096	40	29.46	24	3	80.0	M	2	N	3800	0.5	L			1			N				
													2	82.0	M	2	N	3700	0.5											
													4	81.0	M	2	N	3800	0.5											
221	23	NJW	P28A3	F N	8.9	Y	+10	+10	7546	41	29.31	25	3	80.0	M	2	N	3900	0.5	L			1			N				
													2	82.0	M	2	N	3900	0.5											
													4	80.0	M	2	N	3900	0.5											
265	7	NTC	216A3	F N	9.0	N	+ 8	+ 8	8041	72	29.75	50	3	93.0	M	3	N	2900	1.7	F			1	N	98.0	87.2	N				
													2	96.0	M	3	N	2800	1.7											
													4	89.0	M	3	Y	2300	2.0											
9	29	NTC	216M4	F N	9.0	N	+ 6	+ 6	8188	70	30.15	56	3	87.5	M	4	N	1800	0.8	84.0	4	2000	1.8	1	N			N				
													2	88.0	M	4	N	1600	0.8											
													4	86.0	M	4	N	1900	0.8											
222	23	NTC	216M5	F N	9.0	Y	+ 8	+ 8	6307	48	30.15	33	3	90.0	M	4	N	1500	0.4	89.0	4	1500	3.0	1				N				
													2	91.0	M	4	N	1500	0.4											
													4	90.0	M	4	N	1500	0.4											
223	23	NXW	P28A3	F N	8.9	Y	+10	+10	11701	45	29.14	24	3	82.0	M	3	Y	1800	2.0	80.0	3	1800	3.0	1				N				
													2	84.0	M	2	N	3800	0.8											
													4	82.0	M	2	N	2600	1.2											
177	7	OE2	216M4	F N	9.0	N	+ 8	+ 8	10538	74	30.00	64	3	92.0	M	4	N	1800	0.3	91.0	4	1750	2.0	1	N	94.0	82.4	N				
													2	92.0	M	4	N	1800	0.3											
													4	90.0	M	4	N	1400	0.3											
282	5	OE2	216M4	F N	9.0	N	+ 8	+ 8	34679	72	29.92	53	3	91.0	M	4	N	1150	0.0	90.0	4	1200	4.0	1	N	97.1	86.6	B	M	4	1150	0.0
													2	93.0	M	4	N	1150	0.0											
													4	89.5	M	4	N	1250	0.0											
44	8	OE4	216A3	F N	9.0	Y	+14	+14	26731	73	29.99	36	3	94.0	M	3	N	1500	1.0	94.0	3	1300	4.0	1				A	M	3	1600	1.0
													2	97.0	P	3	N	1250	4.0											
													4	92.0	M	3	N	1500	1.0											
98	32	OE4	216A3	F N	9.0	Y	+14	+14	10345	85	29.48	68	3	90.0	M	3	N	1400	1.2	89.0	3	1250	2.5	1	N	92.6	82.2	N				
													2	91.0	M	3	N	1900	0.6											
													4	90.0	M	3	N	1300	1.2											
198	32	OE4	216A3	F N	9.0	N	+14	+14	11566	85	29.69	62	3	94.0	P	3	N	2100	2.0	94.0	3	2100	2.0	1	N	91.0	82.6	A	M	3	2000	1.0
													2	93.0	P	3	N	1900	2.0											
													4	93.0	P	3	N	1400	2.0											
208	28	OE4	216A3	F N	9.0	Y	+14	+14	9125	70	29.41	50	3	91.0	P	3	N	2000	3.5	91.0	3	2000	3.5	1				N				
													2	92.0	P	3	N	2000	3.5											
													4	90.0	P	3	N	2100	2.5											

OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	SPARK ADVANCE AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAX OCT NO	MAX THR	MAX GEAR	MAX CON	MAX RPM	MAX MV	PART THR OCT NO	PART THR GEAR	PART THR RPM	PART THR MV	OWK FUEL	OWK KN	RATER OCT NO RES	RATER OCT NO MOT	RATER INT THR	RATER GEAR	RATER RPM	RATER MV
209	28	OE4	216A3	F N	9.0	Y	+14	+14	9573	70	29.28	50	3	98.0	P	3	N	1300	2.0	98.0	3	1300	2.0	1				A	P	3	1200	3.0
													2	99.0	P	3	N	1400	2.0												
													4	95.0	P	3	N	1300	2.0												
389	6	OE4	216A3	F N	9.0	Y	+14	+14	15379	50	29.93	36	3	95.0	M	3	N	1800	0.4	95.0	3	1700	1.4	1	N	93.6	82.6	A	M	3	2000	0.4
													2	97.0	M	3	N	2000	0.4												
													4	94.0	M	3	N	1800	0.4												
405	26	OE4	216A3	F N	9.0	Y	+14	+14	10171	76	30.07	50	3	91.0	M	3	N	2300	1.0	90.0	3	1900	2.0	1		98.2	86.2	N				
													2	91.0	M	3	N	2500	1.0												
													4	91.0	M	3	N	1400	1.0												
406	26	OE4	216A3	F N	9.0	Y	+14	+14	10200	73	30.07	54	3	93.0	P	3	N	2050	2.0	93.0	3	2050	2.0	1	N	98.2	86.2	N				
													2	93.0	P	3	N	2200	2.0												
													4	92.0	M	3	N	2400	1.0												
147	32	OE4	216M5	F N	9.0	N	+ 9	+ 9	23521	85	29.21	63	3	90.0	M	4	N	1900	0.2	90.0	4	1900	1.2	1	N	91.8	82.6	N				
													2	92.0	M	4	N	1900	0.2												
													4	91.0	M	4	N	1900	0.2												
212	32	OE4	216M5	F N	9.0	Y	+12	+12	18018	85	29.35	66	3	88.0	M	4	N	1900	0.4	88.0	4	1900	1.4	1	N	91.0	82.4	N				
													2	91.0	P	4	N	1900	1.4												
													4	89.0	P	4	N	1900	1.4												
283	5	OE4	216M5	F N	9.0	Y	+10	+12	7088	70	29.63	52	3	91.0	M	4	N	1900	0.6	F				1	N	92.0	82.9	A	M	4	1900	0.6
													2	92.0	M	4	N	2300	0.6												
													4	91.0	M	4	N	2000	0.6												
100	32	OF3	T38A3	F N	8.7	Y	+10	+10	8819	85	29.51	64	3	84.0	M	3	N	1800	2.6	84.0	3	1800	4.0	1		91.4	82.0					
													2	85.0	M	3	N	1800	2.6												
													4	84.0	M	3	N	1800	2.6												
319	40	OF3	T38A3	F Y H	8.7	Y	+10	+10	16884	64	29.91	72	3	86.0	M	3	N	1700	2.0	84.0	3	1600	5.0	1				N				
													2	89.0	M	3	N	1725	2.0												
													4	87.0	M	3	N	1725	2.0												
320	40	OF3	T38A3	F Y L	8.7	Y	+10	+10	16884	64	29.91	72	3	85.0	M	3	N	1675	2.0	84.0	3	1600	5.0	1								
													2	86.0	M	3	N	1725	2.0												
													4	84.0	M	3	N	1725	2.0												
99	32	OFA	123A3	F N	9.5	Y	+10	+10	13480	85	29.34	69	3	101.0	M	3	N	2600	1.0	F				1	N	91.4	81.8	A	M	3	2600	1.0
													2	101.0	M	3	N	2600	1.0												
													4	100.0	M	3	N	2600	1.0												
390	6	OFA	123A3	F N	9.5	Y	+10	+10	12841	32	30.34	14	3	92.0	M	2	N	2700	1.2	90.0	3	2400	4.0	1	N	92.5	82.2	N				
													2	95.0	M	2	N	2700	1.2												
													4	91.0	M	2	N	2700	1.2												
71	41	OL3	T38A3	C N	8.7	Y	+ 7	+ 7	20847	75	30.02	60	3	95.0	M	2	N	2100	0.9	F				1				A	M	3	1800	2.4
													2	96.0	M	2	N	2100	0.9												
													4	93.0	M	2	N	2100	0.9												

OBS NO	LAB NO	MODEL CODE	EMC T	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	TEMP RAIN	AC VAL	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OMK	OCT NO RES	OCT NO MOT	RATER INT	RATER THR	RATER GEAR	RPM	MV
101	32	OL3	T38A3	F	N	8.7	Y	+ 6	+ 7	11969	85	29.45	68	3	90.0	M	2	N	3100	0.9	F			1	N	91.0	82.5	B	M	2	3000	0.9
														2	91.0	M	2	N	3100	0.9											
														4	90.0	M	2	N	3000	0.9											
102	32	OL3	T38A3	F	N	8.7	Y	+ 7	+ 7	9673	85	29.25	63	3	87.0	M	2	N	2300	0.8	F			1	N	92.7	82.5	N				
														2	87.0	M	2	N	3000	0.8											
														4	87.0	M	2	N	2000	0.8											
284	5	OL3	T38A3	F	N	8.7	Y	+ 8	+ 8	14549	70	30.40	60	3	92.0	M	2	N	1900	1.0	F			1								
														2	93.0	M	2	N	2250	1.0											
														4	91.0	M	2	N	1950	1.0											
372	6	OL3	T38A3	F	N	8.7	Y	+10	+10	14639	56	30.10	55	3	92.0	M	2	N	2100	0.4	F			1	0	94.0	83.5	A	M	3	2000	0.4
														2	96.5	M	2	N	2000	0.4											
														4	91.5	M	2	N	2000	0.4											
437	46	OL3	T38A3	F	N	8.7	Y	+ 7	+ 7	26090	80	29.45	86	3	84.5	M	2	N	1800	0.5	F			1	N			N				
														2	85.0	M	2	N	3050	0.5											
														4	83.5	M	2	N	2300	0.5											
123	28	OLA	123A3	F	N	9.5	Y	+10	+10	15559	70	29.07	50	3	93.0	M	3	N	2600	1.0	91.0	3	2400	2.0	1			N				
														2	94.0	M	3	N	2500	1.0											
														4	91.0	M	3	N	2500	1.0											
103	32	OPF	T50A4	F	N	8.4	Y	+10	+10	21907	85	29.47	63	3	91.0	M	4	N	1800	1.2	90.0	4	1100	3.0	1	Y	91.4	82.3	N				
														2	92.0	M	4	N	1900	1.0											
														4	92.0	M	4	N	1600	1.1											
285	5	OPF	T50A4	F	N	8.4	Y	+10	+10	13657	70	30.30	56	3	91.0	M	3	N	1950	1.2	F			1				N				
														2	91.0	M	3	N	1850	1.0											
														4	90.5	M	3	N	1800	1.1											
407	26	OPF	T50A4	F	N	8.4	Y	+10	+10	9047	79	30.00	90	3	89.0	M	4	Y	1200	1.0	88.0	3	2100	1.8	1		91.2	82.6	N				
														2	90.0	M	4	Y	1200	1.0											
														4	87.0	M	4	Y	1200	1.0											
438	46	OPF	T50A4	F	N	8.4	Y	+ 8	+10	14306	80	29.72	86	3	89.0	M	3	N	1450	0.5	88.0	3	1400	1.5	1	N			N				
														2	91.0	M	3	N	2250	0.5											
														4	88.0	M	3	N	1800	0.5											
124	28	OSW	TP23M5	F	Y	H	8.0	Y	+10	+10	11542	70	29.21	50	3	98.0	M	3	N	1600	-4.0	96.0	4	1550	0.0	1				A	M	3		-4.5
														2	98.0	M	3	N	1600	-5.0											
														4	96.0	M	3	N	1550	-5.0											
125	28	OSW	TP23M5	F	Y	L	8.0	Y	+10	+10	11542	70	29.21	50	3	96.0	M	3	N	1500	-2.5	95.0	4	1400	0.0	1								
														2	97.0	M	3	N	1500	-2.5											
														4	95.0	M	3	N	1500	-2.5											
126	28	OSW	TP23M5	F	Y	H	8.0	Y	+10	+10	9501	70	29.24	50	3	95.0	M	4	N	1700	-2.5	F			1				A	M	4		-2.0
														2	96.0	M	4	N	1600	-2.5											
														4	93.0	M	4	N	1800	-2.5											

OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	SPARK ADVANCE C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	TH	AR	GEAR	CONV	RPM	MV	OCT NO	GEAR	RPM	MV	OWK FUEL	OWK KNK	RATER OCT RES	RATER OCT MOT	RATER INT	RATER THR	RATER GEAR	RATER RPM	RATER MV
127	28	OSW TP23M5	F	Y L	8.0	Y	+10	+10	9501	70	29.24	50	3	93.0	M	4	N	1700	-2.0	F				1								
													2	94.0	M	4	N	1700	-2.0													
													4	91.0	M	4	N	1500	-2.0													
45	8	OTX T23A3	F	N	9.0	Y	+10	+10	22914	78	30.01	77	3	91.0	M	3	N	1500	1.5	90.0	3	1500	5.0	1				B	M	3	1500	1.5
													2	92.0	M	3	N	1450	1.5													
													4	90.0	M	3	N	1500	1.5													
72	41	OTX T23A3	C	N	9.0	Y	+10	+10	6048	72	29.98	57	3	93.0	M	3	N	2200	2.0	90.0	3	1800	2.0	1				B	M	3	2200	2.0
													2	93.0	M	3	N	2200	2.0													
													4	91.0	M	3	N	2200	2.0													
104	32	OTX T23A3	F	N	9.0	Y	+10	+10	11456	85	29.41	66	3	94.0	M	3	N	1300	1.5	94.0	3	1600	3.0	1	0	91.0	82.1	A	M	3	1200	1.6
													2	94.0	M	3	N	2000	0.8													
													4	93.0	M	3	N	1800	0.8													
105	32	OTX T23A3	F	N	9.0		+10	+10	7117	85	29.52	64	3	93.0	M	3	N	1300	1.2	90.0	3	1400	2.0	1	Y	91.6	81.5	B	M	2	3400	1.0
													2	93.0	M	3	N	1450	1.2													
													4	92.0	M	3	N	1450	1.1													
128	28	OTX T23A3	F	N	9.0	Y	+10	+10	9703	70	29.48	50	3	95.0	M	2	N	3200	0.5	F				1				A	M	2	3100	0.5
													2	*96.0*	*M*	*2*	*N*	*3100*	*0.5*													
													4	92.0	M	2	N	2100	0.5													
178	7	OTX T23A3	F	N	9.0	Y	+10	+10	11655	70	29.96	49	3	91.0	M	3	N	2000	0.7	91.0	3	1400	3.0	1	N	92.0	82.1	A	M	2	2800	0.9
													2	94.0	M	2	N	2400	0.9													
													4	89.0	M	3	N	1850	0.7													
286	5	OTX T23A3	F	N	9.0	Y	+10	+10	9605	72	30.18	48	3	91.0	M	3	N	1400	2.1	90.0	3	1200	4.0	1	N	93.9	85.0	B	M	3	2150	2.0
													2	91.5	M	3	N	1400	2.0													
													4	89.5	M	3	N	1275	2.0													
287	5	OTX T23A3	F	N	9.0	Y	+10	+10	17459	70	29.94	60	3	92.0	M	3	N	1550	1.8	91.0	3	1450	3.5	1								
													2	94.0	M	3	N	1650	1.8													
													4	91.0	M	3	N	1350	1.8													
391	6	OTX T23A3	F	N	9.0	Y	+10	+10	22523	45	30.25	25	3	93.0	M	2	N	2500	1.0	93.0	3	2500	4.0	1								
													2	93.5	M	3	N	3300	0.6													
													4	90.0	M	3	N	2400	0.6													
392	6	OTX T23A3	F	N	9.0	Y	+10	+10	18210	40	29.99	16	3	93.0	M	3	N	1500	1.0	93.0	3	1300	2.5	1								
													2	94.0	M	3	N	1300	1.5													
													4	93.0	M	3	N	1300	1.5													
408	26	OTX T23A3	F	N	9.0	Y	+10	+10	8893	75	29.82	113	3	87.0	M	3	N	1650	0.5	85.5	3	1700	2.5	1		92.6	82.8	B	M	3	1800	0.5
													2	89.0	M	3	N	1600	0.5													
													4	87.0	M	3	N	1550	0.5													
106	32	OTX T23M5	F	N	9.0	Y	+ 7	+10	11909	85	29.53	70	3	91.0	P	4	N	2400	4.0	91.0	4	2400	4.0	1	Y			B	P	4	2000	2.0
													2	92.0	P	4	N	2900	3.0													
													4	90.0	P	4	N	1900	2.0													

OBS NO	LAB NO	MODEL CODE	EMC T	KNK SEN	C.R.	SPARK ADVANCE AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM GTR	MAXIMUM EAR	MAXIMUM COV	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	FUEL OWK	RATER OCT RES	RATER NO MOT	RATER INT	RATER GEAR	RATER RPM	RATER MV
256	41	OTX	T23M5	C N	9.0	N	+10	+10	6561	69	30.20	62	3	93.0	M	4	N	2400	0.6	91.0	4	2400	4.0	1 N	91.9	84.4	B	M	4 2350	0.6
													2	93.0	M	4	N	2400	0.6											
													4	90.5	M	4	N	2400	0.6											
321	40	OTX	T23M5	F N	9.0	N	+ 9	+10	6701	52	30.05	58	3	96.0	M	4	N	2450	0.0	F			1			A	M	4 2650	0.0
													2	98.0	M	4	N	2600	0.0											
													4	95.0	M	4	N	2600	0.0											
69	41	PKC	222A3	C N	9.0	Y	+10	+10	12942	74	29.84	61	3	90.0	M	2	N	2750	1.2	F			1			N				
													2	90.0	M	2	N	2750	1.2											
													4	89.0	M	2	N	2750	1.2											
39	8	PKD	T22A3	A N	9.0	Y	+12	+12	10853	69	30.19	46	3	86.0	M	3	N	2150	1.2	F			1			N				
													2	87.0	M	3	N	2100	1.2											
													4	85.0	M	2	N	3000	1.0											
261	7	PKD	T22A3	F N	9.0	N	+12	+12	6812	69	30.50	55	3	95.0	M	2	N	2600	1.0	94.0	3	2200	2.1	1 N	92.4	82.6	A	M	3 2800	1.0
													2	98.0	M	2	N	3500	1.0											
													4	92.0	M	3	N	2600	1.1											
368	6	PKD	T22A3	F N	9.0	Y	+12	+12	8050	62	30.20	58	3	94.0	M	3	N	2700	0.4	92.0	3	2100	2.0	1 Y	93.3	81.9	A	M	3 2300	0.6
													2	96.0	M	3	N	2700	0.4											
													4	89.0	M	3	N	2200	0.6											
2	29	PLC	222A3	F N	9.0		+ 6	+ 6	9403	70	29.98	55	3	90.5	M	2	N	2100	0.8	88.0	3	1900	2.0	1 N				N		
													2	93.0	M	2	N	2100	0.8											
													4	88.0	M	2	N	2000	0.8											
278	5	PLC	222A3	F N	9.0	Y	+12	+12	11290	68	30.07	74	3	90.0	M	2	N	3175	1.5	F			1							
													2	91.0	M	2	N	2950	1.5											
													4	87.0	M	2	N	3200	1.5											
262	7	PLC	222M5	F N	9.0	Y	+10	+10	8253	70	30.25	67	3	89.0	M	4	N	1900	0.7	86.0	4	1900	4.0	1 N	92.7	82.2	N			
													2	90.0	M	4	N	1900	0.7											
													4	86.0	M	4	N	1900	0.7											
1	29	RAA	T17A3	F Y H	9.5	Y			9947	70	30.38	58	3	95.0	P	3	N	2600	6.0	95.0	3	2600	6.0	1 Y	92.3	86.0	B	M	2 2700	1.5
													2	95.0	P	3	N	2300	8.0											
													4	90.5	M	3	N	2700	1.5											
118	28	RAA	T17A3	F Y H	9.5	Y			10280	70	29.27	50	3	81.0	M	2	N	2000	0.5	L			1			N				
													2	83.0	M	2	N	2200	0.5											
													4	79.0	M	2	N	2100	0.5											
119	28	RAA	T17A3	F Y L	9.5	Y			10280	70	29.27	50	3	80.0	M	2	N	1900	0.5	L			1							
													2	82.0	M	2	N	2000	0.5											
													4	77.0	M	2	N	2000	0.5											
120	28	RAA	T17A3	F Y H	9.5	Y			9500	70	29.15	50	3	83.0	P	3	N	2300	6.0	83.0	3	2300	6.0	1				N		
													2	83.0	P	3	N	2250	6.0											
													4	81.0	P	3	N	2250	6.0											

OBS NO	LAB NO	MODEL CODE	EM CT	KNK SEN	C.R.	SPARK ADVANCE AIR	SPARK ADVANCE RCD AS	SPARK ADVANCE TST AS	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM GT HR	MAXIMUM EA R	MAXIMUM CO NV	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	OMIK	FUEL LEAN	RATER OCT NO RES	RATER OCT NO MOT	RATER INTR	RATER GTHR	RATER EAR	RATER RPM	RATER MV
121	28	RAA T17A3	F	Y L	9.5	Y			9500	70	29.15	50	3	81.0	P	3	N	2150	6.0	81.0	3	2150	6.0	1								
													2	82.0	P	3	N	2200	6.0													
													4	80.0	P	3	N	2250	6.0													
202	28	RAA T17A3	F	Y H	9.5	Y			10097	70	29.15	50	3	86.0	P	3	N	2600	3.0	86.0	3	2600	3.0	1				N				
													2	87.0	P	3	N	2600	3.0													
													4	86.0	P	3	N	2600	3.0													
203	28	RAA T17A3	F	Y L	9.5	Y			10097	70	29.15	50	3	85.0	P	3	N	2500	3.0	85.0	3	2500	3.0	1								
													2	86.5	P	3	N	2600	3.0													
													4	85.0	P	3	N	2600	3.0													
369	6	RAA T17A3	F	Y H	9.5	Y			10782	63	30.23	64	3	99.0	P	3	N	2800	7.0	99.0	3	2800	7.0	1				B	M	3	3200	0.8
													2	102.0	P	3	N	3000	7.0													
													4	93.0	M	3	N	3000	0.8													
370	6	RAA T17A3	F	Y L	9.5	Y			10782	63	30.23	64	3	99.0	P	3	N	2800	7.0	99.0	3	2800	7.0	1								
													2	100.0	P	3	N	2500	7.0													
													4	93.0	M	3	N	3000	0.8													
315	40	RAD T14A3		N	9.0	N			9755	32	30.32	21	3	95.0	M	3	N	1550	0.5	91.0	3	1700	5.0	1				A	M	3	1600	0.5
													2	95.5	M	3	N	1700	0.0													
													4	92.0	M	3	N	1725	0.0													
404	26	RAD T14A3	F	N	9.0	Y			21003	78	30.05	120	3	93.0	M	3	N	3300	0.5	93.0	3	3400	2.5	1		92.2	82.4	B	M	3	3100	0.5
													2	94.0	M	3	N	3350	0.5													
													4	89.0	M	3	N	2600	0.5													
326	46	RAD T14M4	C	N	9.0	Y	+ 6	+ 6	32944	80	29.55	90	3	87.0	M	3	N	2100	0.2	87.0	3	1925	1.2	1	Y			B	M	4	1700	0.2
													2	88.0	M	3	N	2200	0.2													
													4	86.0	M	3	N	1950	0.2													
277	5	RAD T14M5	F	N	9.0	Y	+ 8	+ 8	18330	68	30.08	59	3	93.0	M	3	N	3000	0.5	92.0	4	1650	2.5	1	N	92.6	83.5	B	M	4	1675	0.5
													2	94.0	M	3	N	2950	0.5													
													4	92.0	M	4	N	1700	0.5													
38	9	RBD T14A3	C	N	9.0	Y			6285	75	30.09	29	3	97.0	M	3	N	2700	1.5	96.0	3	2350	4.0	1				B	M	2	3000	0.8
													2	98.0	M	3	N	2700	1.5													
													4	94.0	M	3	N	2650	1.5													
68	41	RBD T14A3	C	N	9.0	Y			27356	71	30.02	58	3	93.0	M	3	N	2900	1.2	F				1				A	M	3	2900	1.2
													2	94.0	M	3	N	2900	1.2													
													4	91.0	M	3	N	2900	1.2													
149	32	SNF T50A4	F	N	8.4	Y	+10	+10	11800	85	29.40	67	3	90.0	M	4	N	1300	1.5	89.0	4	1000	3.5	1	N	91.3	82.0	N				
													2	92.0	M	2	N	3400	1.4													
													4	90.0	M	4	N	1000	1.5													
374	6	SNF T50A4	F	N	8.4	Y	+10	+10	9408	51	30.14	16	3	90.0	M	3	N	2100	1.4	89.0	4	1400	3.0	1								
													2	91.0	M	3	N	1900	1.4													
													4	91.0	M	3	N	1400	0.8													

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION							
							SPARK ADVANCE						MAXIMUM					PART THROTTLE							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	THR	GEAR	COV	RPM	MV	SEAR	OCT NO	RPM	MV	FUEL	OWK	OCT RES	NO MOT	NIT	GEAR	RPM	MV
74	41	SPF T50A4	C	N	8.4	Y	+10	+10	11581	74	30.04	59	3	90.0	M	4	N	1600	1.2	F			1				N			
													2	91.0	M	4	N	1600	1.2											
													4	89.0	M	4	N	1600	1.2											
409	26	SPF T50A4	F	N	8.4	Y	+10	+10	26869	79	29.96	119	3	95.0	M	3	N	1150	0.5	93.0	4	1075	4.0	1		92.9	82.6	A	M	4 1100	1.0
													2	96.0	M	3	N	1200	0.5											
													4	94.5	M	3	N	1200	0.5											
450	46	ETA 224M5	F	N	8.3	Y	+ 3	+ 3	24154	80	29.72	73	3	92.0	P	4	N	2050	9.0	92.0	4	2050	9.0	1	Y			N			
													2	96.0	P	4	N	1900	9.0											
													4	82.0	P	4	N	1850	9.0											
160	47	KTMT 252A3	C	N	8.7	Y	+ 8	+ 8	9973	70	29.94	50	3	98.0	P	3	N	2900	8.0	98.0	3	2900	8.0	1							
													2	95.5	M	3	N	2800	1.5											
													4	92.0	M	3	N	2150	1.5											
161	47	KTMT 252A3	C	M	8.7	Y	+ 6	+ 8	6050	70	30.00	46	3	98.0	P	3	N	2800	8.0	98.0	3	2800	8.0	1							
													2	94.5	M	3	N	2700	1.5											
													4	91.0	M	3	N	2150	1.5											
249	23	NTLH 450A4	F	Y H	9.2	Y	+ 6	+ 4	7257	64	29.36		3	91.0	M	4	Y	1100	1.0	91.0	4	1100	2.0	1				N			
													2	91.0	M	4	Y	1100	1.0											
													4	90.0	M	4	Y	1100	1.0											
250	23	NTLH 450A4	F	Y L	9.2	Y	+ 6	+ 4	7257	64	29.36		3	87.0	M	4	Y	1100	1.0				1							
													2	88.0	M	4	Y	1100	1.0											
													4	86.0	M	3	N	1800	1.0											
308	5	NTLH 450A4	F	Y H	9.2	N	+10	+10	41557	70	29.65	52	3	88.0	M	3	N	2050	1.9	F			1				N			
													2	90.0	M	3	N	1800	2.0											
													4	88.0	M	4	Y	1850	1.8											
309	5	NTLH 450A4	F	Y L	9.2	N	+10	+10	41557	70	29.65	52	3	88.0	M	3	N	2050	1.9				1							
													2	89.0	M	3	N	1775	1.8											
													4	88.0	M	4	Y	1850	2.4											
449	46	NTLH 450A4	F	Y H	9.2	Y	+ 4	+ 4	18946	80	29.41	85	3	87.0	M	4	Y	1450	0.5	85.0	4	1700	1.5	1	N			N			
													2	87.0	M	4	Y	1425	0.5											
													4	85.0	M	4	Y	1650	0.5											
429	26	NTLN 443A3	F	Y H	9.3	Y	0	0	18120	69	30.12	72	3	92.0	M	2	N	1850	0.5	F			1		94.5	83.0	N			
													2	93.0	M	2	N	2000	0.5											
													4	92.0	M	2	N	1800	0.5											
448	46	OTLY 149A3	F	N	8.5	Y	+12	+10	11650	84	29.32	100	3	87.0	M	3	N	1975	0.5	83.0	3	2000	1.5	1	N			N			
													2	89.0	M	3	N	2025	0.5											
													4	86.0	M	3	N	2100	0.5											
307	5	OTMH V258A3	F	N	8.3	N	+10	+10	9285	70	29.53	77	3	90.0	M	3	N	2700	1.8	F			1							
													2	92.0	M	3	N	2550	1.8											
													4	86.0	M	2	N	2000	1.8											

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION								
							SPARK ADVANCE						MAXIMUM						PART THROTTLE							RATER					
OBS NO	LAB NO	MODEL CODE	EMCT	KNK SEN	C.R.	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	THR	GEAR	CON	RPM	MV	OCT NO	GEAR	RPM	MV	FUEL	OWK	OCT NO RES	OCT NO MOT	NIT	GTHR	GEAR	RPM	MV
31	29	OTSA	P23A4	F N	9.5		+10	+10	8185	70	30.21	58	3	90.0	M	2	Y	3300	0.8	88.0	4	1900	3.0	1		92.0	83.6	A	M	4	2500	3.0
													2	91.0	M	4	Y	2500	1.9											
													4	90.5	M	2	Y	2400	0.8											
150	32	OTSA	P23M5	F Y	H 9.5	Y	+11	+11	17335	85	29.08	63	3	86.0	P	4	N	1300	1.2	86.0	4	1300	1.2	1	N	91.9	81.4	N				
													2	85.0	M	4	N	2600	0.4											
													4	86.0	M	4	N	2300	0.3											
151	32	OTSA	P23M5	F Y	L 9.5	Y	+11	+11	17335	85	29.08	63	3	86.0	P	4	N	1300	1.2	86.0	4	1300	1.2	1								
													2	85.0	M	4	N	2600	0.4											
													4	85.0	M	4	N	2250	0.5											
91	41	OTSS	228M5	C N	8.7	N	+10	+10	6192	70	30.16	58	3	90.0	M	4	N	2100	0.4	F				1	N	93.0	84.2	N				
													2	91.0	M	4	N	2100	0.4											
													4	89.0	M	4	N	2100	0.4											
142	28	NUSB	228A4	F N	8.5	Y	+12	+12	9873	70	29.37	50	3	86.0	M	4	Y	1550	2.0	84.0	4	1400	3.0	1				N				
													2	86.0	M	4	Y	1450	2.0											
													4	85.0	M	4	Y	1500	2.0											
163	47	NUSB	228A4	C N	8.5	Y	+10	+10	7760	70	29.90	50	3	91.5	M	4	Y	1800	2.5	90.0	4	1900	3.5	1	N			N				
													2	92.5	M	4	Y	1900	2.5											
													4	90.5	M	4	Y	1600	2.5											
174	41	NUSB	228A4	C N	8.5	Y	+10	+10	6363	64	30.36	58	3	95.0	M	4	Y	1600	2.0	92.0	4	1600	3.0	1	N	97.7	87.8	B	M	4	1600	2.0
													2	96.0	M	4	Y	1600	2.0											
													4	94.0	M	4	Y	1600	2.0											
254	23	NUSB	228A4	F N	8.5	Y	+12	+12	8663	58	30.34	29	3	90.0	M	4	Y	1400	2.0	88.0	4	1350	4.0	1				N				
													2	90.0	M	4	Y	1400	2.0											
													4	90.0	M	4	Y	1400	2.0											
255	23	NUSE	T25M5	F N	9.0	Y	+ 8	+ 8	26383	57	30.13	37	3	82.0	M	4	N	2800	0.6	L				1				N				
													2	85.0	M	4	N	2800	0.6											
													4	L																		
141	28	KVSG	226A3	F N	8.7	Y	+ 7	+ 7	10347	70	29.37	50	3	92.0	M	2	N	2250	1.5	89.0	3	1900	3.5	1				N				
													2	92.5	M	2	N	2150	1.5											
													4	90.5	M	2	N	2000	1.5											
275	7	NVLH	450A3	F Y	H 9.2	N	+ 4	+ 4	7285	68	30.19	52	3	91.0	M	2	N	2250	1.9	90.0	3	1600	4.0	1	N	93.2	82.4	N				
													2	94.0	M	3	Y	1200	2.6											
													4	92.0	M	3	Y	1650	2.6											
251	23	NVLL	457A4	F N	8.2	Y	+ 8	+ 8	11867	56	29.96	40	3	90.0	P	4	Y	1300	4.0	90.0	4	1300	4.0	1				N				
													2	93.0	P	4	Y	1300	4.0											
													4	87.0	M	4	Y	1300	1.0											
252	23	NVSN	443A4	F Y	H 9.3	Y	+ 2	0	6198	48	30.23	21	3	92.0	M	4	Y	1050	1.0	92.0	4	1050	7.0	1				B	M	4	1100	1.0
													2	91.0	M	4	Y	1100	1.0											
													4	90.0	M	4	Y	1200	1.0											

OBS NO	LAB NO	MODEL CODE	EMC T	KNK SEN	C.R.	AIR	SPARK ADVANCE RCD	SPARK ADVANCE TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM GRADE	MAXIMUM TEMP	MAXIMUM AVOID	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	OWK FUEL	RATER OCT RES	RATER OCT MOT	RATER INT	RATER THR	RATER GEAR	RATER RPM	RATER MV
253	23	MVSN	443A4	F Y	L	9.3	Y	+ 2	0	6198	48	30.23	21	3	86.0	P	4	Y	1200	7.0	86.0	4	1200	7.0	1							
														2	84.0	M	4	Y	1100	1.0											
														4	83.0	P	4	Y	1200	7.0											
162	47	OVLG	250A4	C	N	8.4	Y	+ 8	+10	15580	70	30.03	46	3	95.0	M	3	N	2500	1.0	F				1							
														2	96.0	M	3	N	2500	1.0											
														4	92.0	M	3	N	1650	1.0											
152	32	OVLH	V458A3	F	N	8.3	Y	+ 9	+ 9	12044	85	29.19	58	3	94.0	M	3	N	2500	0.9	94.0	3	2500	2.0	1	N	91.9	81.8	A	M	3	2500	0.9
														2	94.0	M	3	N	2600	0.9											
														4	92.0	M	3	N	2500	0.9											
115	32	OVLY	149A3	F	N	8.5	Y	+10	+10	16868	85	29.15	66	3	91.0	M	3	N	2300	1.8	88.0	3	2100	5.0	1	Y	91.3	81.4	B	M	3	2100	1.3
														2	92.0	M	3	N	2300	1.8											
														4	90.0	M	3	N	2000	1.8											
189	7	OVLY	149A3	F	N	8.5	N	+10	+10	11213	72	30.44	50	3	94.0	M	3	N	1700	2.0	F				1							
														2	96.0	M	2	N	1750	2.1											
														4	90.0	M	2	N	1600	2.1											
153	32	OVLY	149A4	F	N	8.5	Y	+10	+10	16786	85	29.72	66	3	92.0	P	4	N	1600	8.0	92.0	4	1600	8.0	1	N	91.2	81.6	N			
														2	93.0	P	4	N	1500	8.0											
														4	91.0	P	4	N	1500	8.0											
274	7	PVSC	222M5	F	N	9.0	Y	+10	+10	6189	72	30.40	58	3	90.0	M	4	N	2200	0.7	86.0	4	2400	2.0	1	N	93.1	82.9	B	M	3	3700	0.9
														2	94.0	M	4	N	3000	0.7											
														4	88.0	M	4	N	1800	0.7											
32	29	AU	P18M5	F	N	10.0	Y	+12	+12	8216	72	30.09	58	3	93.0	M	4	N	1900	1.0	91.0	4	2300	3.0	1	9	92.8	83.4	A	M	4	1800	1.0
														2	94.0	M	4	N	2000	1.0											
														4	90.5	M	4	N	2000	1.0											
310	5	AU	P22M5	F	N	8.5	Y	+ 6	+ 6	6270	72	29.83	53	3	83.0	M	4	N	2700	1.0	F				1	N	92.8	83.1	N			
														2	84.0	M	4	N	2900	1.0											
														4	83.0	M	4	N	2600	0.9											
33	29	B	P18A3	F	N	8.5	Y	+ 6	+ 6	9551	70	29.48	62	3	87.5	M	3	N	2600	1.1	83.0	3	2400	3.0	1	N			N			
														2	89.5	M	2	N	2700	1.0											
														4	84.0	M	3	N	2800	1.1											
190	7	B	P18A3	F	N	8.5	Y	+ 6	+ 6	6050	75	30.05	68	3	84.0	M	3	N	2800	1.0	F				1	N	94.0	82.4	N			
														2	88.0	M	2	N	3300	0.7											
														4	80.0	M	2	N	2900	0.7											
430	26	B	P18A3	F	N	8.5	Y	+ 6	+ 6	10305	83	29.87	130	3	86.0	M	3	N	2900	1.5	85.0	3	2700	2.0	1		98.2	86.2	N			
														2	85.0	M	3	N	2800	1.5											
														4	84.0	M	3	N	2700	1.5											
431	26	B	P18A3	F	N	8.5	Y	+ 6	+ 6	10252	81	30.03	128	3	85.0	M	3	N	2700	0.5	84.0	3	2700	3.0	1		98.2	86.2	N			
														2	86.0	M	3	N	2700	0.5											
														4	83.0	M	3	N	2700	0.5											

OBS NO	LAB NO	MODEL CODE	ENG CONT	KNK SEN	C.R.	SPARK ADVANCE AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	OCT NO	GTE HRR	AC ONV	RPM	MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	FUEL	ON K	RATER OCT RES	RATER OCT MOT	RATER INT TRR	RATER GTE AR	RATER RPM	RATER MV
175	41	C 215M4	C	N	9.4	N	+ 3	+ 3	12285	69	30.02	58	3	91.0	M	4 N	1600	1.0	89.0	4	1600	2.0	1	N	92.1	84.0	N			
													2	91.0	M	4 N	1600	1.0												
													4	88.0	M	4 N	1600	1.0												
34	29	C 220A3	F	N	8.5	Y	+ 5	+ 5	12486	70	30.21	60	3	94.0	M	3 N	2200	1.8	F				1	N	92.3	83.6	A	P	3	1900
													2	95.0	M	3 N	2200	1.8												
													4	90.0	M	2 N	2400	1.4												
311	5	E 216A3	F	N	9.4	Y	+10	+10	6519	67	30.20	52	3	87.0	M	2 N	3575	2.2	F				1							
													2	89.0	M	2 N	3500	2.2												
													4	85.0	M	2 N	3000	2.2												
354	62	E 216A3	F	N	9.4	Y	+ 8	+ 8	16028	70	29.95	60	3	87.0	M	3 N	2550	2.3	F				1	N	91.7	82.4	N			
													2	90.0	M	3 N	2250	2.3												
													4	86.0	M	3 N	2600	2.3												
355	62	E 216A3	F	N	9.4	Y	+ 8	+ 8	16084	69	30.22	47	3	86.0	M	3 N	2500	2.0	F				1	N	92.4	83.1	N			
													2	90.0	M	2 N	2600	2.3												
													4	85.0	M	3 N	2500	2.0												
356	62	E 216M5	F	N	9.4	N	+15	+15	13823	74	30.09	60	3	91.0	M	4 N	2000	1.3	90.0	4	1800	3.0	1	N	92.4	81.9	N			
													2	92.0	M	4 N	2100	1.3												
													4	91.0	M	4 N	2100	1.3												
143	28	E P20A3	F	N	8.5	Y	0	0	10374	70	29.24	50	3	84.0	M	2 N	2600	0.5	F				1				N			
													2	86.0	M	2 N	2700	0.5												
													4	84.0	M	2 N	2700	0.5												
191	7	E P20A3	F	N	8.5	Y	0	0	12093	70	30.71	52	3	94.0	M	3 N	2500	0.6	F				1	N	95.1	84.9	N			
													2	96.0	M	2 N	2700	0.5												
													4	88.0	M	3 N	2600	0.6												
210	28	E P20A3	F	N	8.5	Y	0	0	9549	70	29.42	50	3	85.0	M	2 N	2400	0.5	82.0	3	1950	2.0	1				N			
													2	86.0	M	2 N	2400	0.5												
													4	85.0	M	2 N	2500	0.5												
211	28	E P20A3	F	N	8.5	Y	0	0	9903	70	29.41	50	3	87.0	M	2 N	2400	0.5	83.0	3	2100	2.0	1				N			
													2	87.0	M	2 N	2400	0.5												
													4	85.0	M	2 N	2300	0.5												
357	62	E P20M5	F	N	8.5	Y	+ 4	+ 4	6527	71	30.35	56	3	90.0	P	4 N	3600	2.0	90.0	4	3600	2.0	1	N	92.0	82.1	N			
													2	92.0	M	3 N	4300	0.5												
													4	90.0	M	3 N	3200	0.5												
401	6	E P26M5	F	N	9.0	Y	+20	+20	10697	34	30.08	21	3	88.0	M	4 N	2000	0.2	F				1	N	101.9	94.0	N			
													2	88.0	M	4 N	1650	0.2												
													4	87.0	M	4 N	2300	0.2												
35	29	E P30A4	F	N	9.0		+20	+20	9546	70	30.01	63	3	92.0	M	3 Y	2200	1.3	91.0	4	2000	6.0	1				N			
													2	93.0	P	4 Y	1950	6.0												
													4	89.0	M	4 Y	2000	1.3												

OBS NO	LAB NO	VEHICLE DESCRIPTION: MODEL CODE	EM CT	KNK SEN	C.R.	SPARK ADVANCE: AIR	AS RCD	AS TST	ODOM MILES	WEATHER: AMB TMP	BAROM	HUM	FUEL	OCTANE NUMBER REQUIREMENT DATA: MAXIMUM: OCT NO	GT HR	EA RV	CO N	RPM	MV	PART THROTTLE: OCT NO	GE AR	RPM	MV	FUEL	OW UK	RATER: OCT NO RES	OCT NO MOT	NI NT	GT HR	GE AR	RPM	MV
358	62	E P30A4	F	N	9.0	Y	+20	+20	23478	72	30.17	58	3	88.0	M 4	N	1400	0.9	F				1	N	93.3	82.7	N				
													2	91.0	M 2	N	2100	1.1													
													4	87.0	M 2	N	2500	1.1													
360	62	E P30M5	F	N	9.0	Y	+23	+20	10846	70	30.45	53	3	93.0	M 4	N	1400	0.6	F				1	N	93.0	82.5	B	M	4	1800	0.6
													2	95.0	M 4	N	1600	0.6													
													4	89.0	M 4	N	1400	0.6													
359	62	E TP30A4	F	N	7.8	Y	+20	+20	8115	72	29.88	50	3	86.0	M 2	N	4000	-8.0	85.0	4	2300	2.0	1	N	93.0	83.0	N				
													2	87.0	M 2	N	4000	-8.0													
													4	85.0	M 2	N	4400	-8.0													
36	29	J 313M4	F	N	9.3	N	+21	+21	27607	70	30.21	60	3	H	M 4	N	1700	0.7	H	4	1900	2.5	1	O	92.1	83.7	A	P	4	1290	7.0
													2	H	M 4	N	1700	0.7													
													4	H	M 3	N	1800	1.0													
144	28	J 313M4	F	N	9.3	Y	+21	+21	9964	70	29.41	50	3	86.0	M 3	N	1900	1.0	82.0	4	1650	2.0	1				N				
													2	88.0	M 3	N	1800	1.0													
													4	86.0	M 3	N	1900	1.0													
432	26	J 313M4	F	N	9.3	Y	+21	+21	10221	79	30.06	107	3	88.0	M 4	N	2100	0.6	86.0	4	2500	2.0	1		98.2	86.2	N				
													2	88.0	M 4	N	1900	0.6													
													4	88.0	M 4	N	1500	0.6													
433	26	J 313M4	F	N	9.3	Y	+21	+21	10165	77	29.93	99	3	87.5	M 4	N	1500	0.8	87.0	4	1900	3.0	1		98.2	86.2	N				
													2	87.0	M 3	N	2300	0.8													
													4	89.0	M 4	N	1350	0.8													
92	41	J 315A3	C	N	9.3	N	+15	+15	15221	72	30.02	63	3	98.0	M 3	N	3100	1.5					1	N	92.8	83.8	N				
													2	88.0	M 3	N	3100	1.5													
													4	87.0	M 3	N	3100	1.5													
344	60	J 315M4	F	N	9.3	N	+22	+22	6152	70	30.18	51	3	90.0	M 3	N	2100	1.0	F				1	N	94.0	82.9	N				
													2	91.0	M 3	N	2100	1.0													
													4	88.0	M 4	N	1900	0.9													
93	41	J 315M5	C	N	9.3	N	+20	+20	6228	75	30.12	58	3	87.0	M 4	N	2800	1.0	F				1	N	92.5	83.6	N				
													2	87.0	M 4	N	2800	1.0													
													4	85.0	M 4	N	2800	1.0													
384	6	J 315M5	F	N	9.3	Y	+20	+20	8886	68	29.97	44	3	88.0	M 4	N	3000	1.0	88.0	4	2400	2.0	1	N	93.4	82.3	N				
													2	90.0	M 4	N	2800	1.0													
													4	87.0	M 4	N	2900	1.0													
385	6	J 318A4	F	N	8.8	Y	+18	+18	6869	50	30.21	33	3	91.0	M 3	N	2600	2.0	F				1				B	M	4	2400	2.3
													2	92.0	M 3	N	2600	2.0													
													4	93.0	M 3	N	2300	2.3													
434	26	J 318A4	F	N	8.8	Y	+18	+18	17565	62	30.26	46	3	84.0	M 2	N	4200	1.5	F				1		92.2	82.3	N				
													2	87.0	M 2	N	4600	1.5													
													4	78.0	M 2	N	2500	1.5													

OBS NO	LAB NO	VEHICLE DESCRIPTION: MODEL CODE	EM CT	KNK SEN	C.R.	AIR	SPARK ADVANCE: AS RCD	AS TST	ODOM MILES	WEATHER: AMB TMP	BAROM	HUM	FUEL	MAXIMUM: OCT NO	GTH	GEAR	COV	RPM	MV	PART THROTTLE: OCT NO	SEAR	RPM	MV	OWK FUEL	OWK KNK	RATER: OCT NO RES	OCT NO MOT	NITR	GEAR	RPM	MV
164	47	J 318M5	C	N	8.8		+16	+18	7000	70	29.89	50	3	90.0	M	4	N	1750	1.0	F				1							
													2	90.0	M	4	N	2000	1.0												
													4	88.0	M	4	N	1750	1.0												
131	28	N 210M5	F	N	9.5	Y	+10	+10	9744	70	29.21	50	3	94.0	M	4	N	1200	0.5	92.0	4	1250	3.0	1				A	M	4	
													2	95.0	M	4	N	1400	0.5												
													4	94.0	M	4	N	1250	0.5												
402	6	N 210M5	F	N	9.5	N	+10	+10	8237	41	30.19	20	3	92.0	M	4	N	3600	1.1	92.0	4	3400	2.2	1				A	M	4	3600	1.1
													2	95.0	M	3	N	4800	1.1												
													4	93.0	M	4	N	2200	1.0												
276	7	Q 216M4	F	N	9.0	N	+ 8	+ 8	7233	70	30.22	52	3	92.0	M	4	N	1450	1.0	91.0	4	1300	2.0	1	N	97.6	87.0	N			
													2	94.0	M	3	N	3800	1.5												
													4	87.0	M	3	N	1500	1.5												
345	60	T 215M5	F	N	9.0	Y	+ 5	+ 5	6270	68	30.49	50	3	93.0	M	4	N	1900	0.9	89.0	4	1700	2.0	1	N	92.6	82.9	N			
													2	94.0	M	4	N	2100	0.9												
													4	91.0	M	4	N	1750	0.9												
94	41	T 216A3	C	N	9.0	Y	+ 5	+ 5	20920	69	30.12	56	3	94.0	M	3	N	2750	1.5	F				1				A	M	3	2750	1.5
													2	94.0	M	3	N	2750	1.5												
													4	91.0	M	3	N	2750	1.5												
346	60	T 216A3	F	N	9.0	Y	+ 5	+ 5	10126	70	30.22	60	3	94.0	M	2	N	3400	0.7	F				1	N	98.0	87.0	B	M	3	3200	0.6
													2	95.0	M	2	N	2900	0.7												
													4	89.0	M	2	N	2500	0.7												
435	26	T 216A3	F	N	9.0	Y	+ 8	+ 5	18571	58	30.27	41	3	90.0	M	2	N	3500	1.5	F				1		92.9	82.6	A	M	2	3500	1.5
													2	93.0	M	2	N	3900	1.5												
													4	88.5	M	2	N	2500	1.5												
67	8	T 216M5	A	N	9.0	Y	+ 5	+ 5	16387	73	29.95	40	3	92.0	M	4	N	2300	0.9	F				1				B	M	4	1800	0.9
													2	93.0	M	3	N	3800	0.9												
													4	91.0	M	4	N	1900	0.9												
95	41	T 216M5	C	N	9.0	Y	+ 5	+ 5	28520	70	30.17	56	3	95.0	M	4	N	1800	1.0	F				1				A	M	4	1800	1.0
													2	96.0	M	4	N	1800	1.0												
													4	94.0	M	4	N	1800	1.0												
165	47	T 216M5	C	N	9.0	N	+ 5	+ 5	8000	70	29.89	50	3	89.5	M	4	N	3500	0.5	88.0	4	3500	1.5	1	N			N			
													2	91.0	M	4	N	3750	0.5												
													4	88.0	M	4	N	2500	0.5												
347	60	T 216M5	F	N	9.0	Y	+15	+ 5	11792	69	30.55	50	3	88.0	M	3	N	1600	0.7	85.0	4	1600	2.0	1	N	91.9	83.3	B	M	4	2000	0.5
													2	90.0	M	3	N	2900	0.7												
													4	89.0	M	4	N	1800	0.5												
145	28	T P16M5	F	N	9.4	Y	+10	+10	10678	70	29.31	50	3	90.0	M	4	N	2200	0.5	88.0	4	1900	2.0	1				N			
													2	91.0	M	4	N	2200	0.5												
													4	87.0	M	4	N	2250	0.5												

OBS NO	LAB NO	MODEL CODE	EMC T	KNK SEN	SPARK ADVANCE AIR C.R.	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM GEAR	MAXIMUM CON	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	TANK FUEL INFORMATION FUEL LEVEL	TANK FUEL INFORMATION OMK	RATER OCT RES	RATER OCT MOT	RATER INT	RATER THR	RATER GEAR	RATER RPM	RATER MV
66	8	T P20A3	A	N	8.7	Y	+ 5	+ 5	18468	80	29.30	64	3	89.0	M	3	N	2250	1.5	87.0	3	1950	7.0	1				N			
													2	90.0	M	3	N	2300	1.5												
													4	86.0	M	3	N	2300	1.5												
37	29	T P20A4	F	N	8.7	Y	+ 5	+ 5	9770	70	29.48	62	3	86.0	M	3	Y	2200	0.9	83.0	3	2100	3.0	1	N			N			
													2	85.5	M	3	Y	2300	0.9												
													4	86.5	M	3	Y	2300	0.9												
146	28	T P20A4	F	N	8.7	Y	+ 5	+ 5	10421	70	29.28	50	3	91.0	P	4	Y	1500	7.0	91.0	4	1500	7.0	1				N			
													2	93.0	P	4	Y	1500	7.0												
													4	91.0	P	4	Y	1600	7.0												
166	47	T P20A4	C	N	8.7	Y	+ 5	+ 5	14500	70	30.03	50	3	88.5	M	4	Y	2000	0.5	86.5	4	2000	1.5	1							
													2	89.5	M	4	Y	2500	0.5												
													4	87.5	M	4	Y	2000	0.5												
167	47	T P20A4	C	N	8.7	Y	+ 5	+ 5	10200	70	29.98	50	3	86.5	M	4	Y	2200	0.5	84.0	4	2150	5.0	1							
													2	87.0	M	4	Y	2300	0.5												
													4	86.5	M	4	Y	2300	0.5												
348	60	T P20A4	F	N	8.7	Y	+ 5	+ 5	8263	68	30.24	64	3	87.0	M	4	N	1500	1.1	86.0	4	1500	5.0	1	N	92.4	82.3	N			
													2	89.0	M	4	N	1650	1.1												
													4	85.0	M	2	N	2800	0.5												
365	47	T P20A4	C	N	8.7	Y	+ 5	+ 5	6625	70	30.35	41	3	91.0	P	4	Y	1400	6.0	91.0	4	1400	6.0	1							
													2	90.0	M	4	Y	1800	0.5												
													4	88.0	M	4	Y	1900	0.5												
366	47	T P20A4	C	N	8.7	Y	+ 5	+ 5	13375	70	30.25	44	3	89.0	M	4	Y	1750	0.5	89.0	4	1500	8.0	1							
													2	89.0	M	4	Y	1850	0.5												
													4	88.0	M	4	Y	1900	0.5												
97	41	T P24A4	C	Y	L	9.0	Y	+ 5	+ 5	9475	68	29.94	55	3	82.0	M	4	N	2100	2.2				1								
													2	83.0	M	4	N	2100	2.2												
													4	78.0	M	4	N	2100	2.2												
96	41	T P24A4	C	Y	H	9.0	Y	+ 5	+ 5	9475	68	29.94	55	3	96.0	M	4	N	2100	2.2	F			1				B	M	4	2100	2.2
													2	96.0	M	4	N	2100	2.2												
													4	95.0	M	4	N	2100	2.2												
349	60	T P28A4	F	N	9.2	Y	+12	+10	6072	72	30.48	58	3	90.0	M	4	Y	1300	0.5	86.0	4	1200	2.0	1	N	95.1	84.4	N			
													2	92.0	M	4	Y	1300	0.5												
													4	85.0	M	4	Y	1200	0.5												
350	60	T P28A4	F	N	9.2	Y	+10	+10	12313	71	30.02	60	3	90.0	M	4	Y	1500	1.2	90.0	4	1350	3.0	1	N	92.9	82.2	N			
													2	92.0	M	2	N	3800	0.6												
													4	86.0	M	3	N	2250	0.8												
259	41	T P28A4	C	Y	H	9.2	Y	+10	+10	11808	70	30.30	60	3	95.0	M	4	N	1600	0.6	F			1	N	97.5	86.6	N			
													2	95.0	M	4	N	1600	0.6												
													4	94.0	M	4	N	1600	0.6												

OBS NO	LAB NO	MODEL CODE	EM CT	KNK SEN	C.R.	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BAROM	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THERM	MAXIMUM RPM	MAXIMUM MV	PART THROTTLE OCT NO	PART THROTTLE GEAR	PART THROTTLE RPM	PART THROTTLE MV	OWNK FUEL	OWNK	RATER OCT NO RES	RATER OCT NO MOT	RATER INT	RATER THR	RATER GEAR	RATER RPM	RATER MV
260	41	T P28A4	C	Y L	9.2	Y	+10	+10	11808	70	30.30	60	3	88.0	M 4 N	1600	0.6					1								
													2	89.0	M 4 N	1600	0.6													
													4	86.0	M 4 N	1600	0.6													
312	5	V P23A3	F	N	9.5	Y	+12	+12	23764	69	29.78	89	3	90.0	M 3 N	2800	1.0	88.0	3	1650	7.0	1								
													2	92.0	M 3 N	2825	1.0													
													4	90.0	M 2 N	2500	1.0													
403	6	Z 220A3	F	N	8.6		+ 8	+ 8	14494	51	29.86	28	3	91.0	P 3 N	2750	8.0	91.0	3	2750	8.0	1	N	93.0	82.1	N				
													2	94.0	P 3 N	2700	8.0													
													4	85.0	M 3 N	2500	1.0													
168	47	Z 220M5	C	N	8.6	Y	+ 8	+ 6	13600	70	29.98	50	3	87.0	M 4 N	1600	1.0	F				1								
													2	88.0	M 4 N	1700	1.0													
													4	87.0	M 4 N	1600	1.0													
170	47	CT 220M4	C	N	8.5	Y	+ 5	+ 5	7110	70	29.98	50	3	87.0	M 4 N	1650	0.5	85.0	4	1650	5.0	1								
													2	88.0	M 4 N	3150	0.5													
													4	86.0	M 4 N	1700	0.5													
313	5	CT 220M4	F	N	8.5	N	+ 5	+ 5	6532	68	30.33	68	3	93.0	P 4 N	2200	8.0	93.0	4	2200	8.0	1	N	95.8	86.1	N				
													2	95.0	P 4 N	2050	8.0													
													4	91.0	M 4 N	2250	1.0													
169	47	ET 224M5	C	N	8.5	Y	+ 1	+ 3	14400	70	30.05	50	3	90.5	M 4 N	3000	1.0	89.0	4	1750	7.0	1								
													2	91.5	M 4 N	3500	1.0													
													4	89.0	M 4 N	1500	1.0													
171	47	TT 224M4	C	N	9.0	Y	0	0	8200	70	30.00	50	3	93.0	M 4 N	1500	0.5	91.0	4	1500	1.5	1								
													2	93.0	M 4 N	2900	0.5													
													4	93.0	M 4 N	1250	0.5													
314	5	TT 224M5	F	N	9.0	N	0	0	23554	72	30.35	48	3	90.0	M 4 N	1500	0.7	87.0	4	1340	3.0	1		91.8	82.0	A	M	4	1450	0.7
													2	90.0	M 4 N	1400	0.7													
													4	91.0	M 4 N	1750	0.8													

APPENDIX F

PROCEDURES FOR CALCULATING AND PLOTTING OCTANE NUMBER REQUIREMENT DISTRIBUTION DATA

WEIGHTED VEHICLE/CAR POPULATIONS

Weighting factors for each vehicle model were developed from information supplied by the US vehicle manufacturers and from information published (Ward's Automotive Reports) for imported vehicles. These weight factors were proportioned to the relative production and/or sales volumes of the vehicles tested.

For any vehicle having octane requirements lower (L) than the lowest octane number fuel available within a given fuel series, a number 0.5 Research/0.4 Motor lower was assigned. Similarly, for any vehicle having octane requirements higher (H) than the highest octane fuel available within a given fuel series, a number 0.5 Research/0.4 Motor higher was assigned.

The weighting factors of each vehicle model were divided by the number of vehicles tested to calculate individual vehicle weight factors. The octane requirements for each vehicle were then arranged in increasing order with the appropriate individual weighting factors. The percent of vehicles at each octane requirement level represents the summation of all vehicle weighting factors before that level, plus one-half the sum of the weighting factors at that level. The individual vehicle weighting factors are adjusted so that the summation of all weighting factors is 100.00 for any vehicle population of interest. The midpoint percentiles are plotted versus octane number requirement on arithmetic probability paper and a distribution curve is drawn through the points.

SELECT CAR MODELS

For individual car models, the octane number requirement distribution curves were plotted by the "Ƶ" method as described in "Statistical Estimation of the Gasoline Octane Number Requirement of New Model Automobiles," C. S. Brinegar and R. R. Miller, Technometrics, Vol. 2, No. 1, February 1960.

The procedure is as follows:

For any cars having octane requirements lower (L) than the lowest octane number fuel available within a given fuel level, a number 1.0 Research/0.7 Motor lower was assigned. Similarly, for individual cars having octane requirements higher (H) than the highest octane fuel available within a given fuel series, a number 1.5 Research/1.1 Motor higher was assigned.

Using all observed and estimated octane number values, calculate the mean ($\bar{X}$) and the standard deviation (s) from the data for each car model.

$$s = \left(\frac{1}{n-1} (X - X)^2 \right)^{1/2}$$

Where X_i = Octane number requirement of i^{th} car of a given model

n = Number of cars of that model.

Estimate octane number requirements at the percentiles of interest from octane number requirement distribution data by

$$O.N. = \overline{X} + ks$$

Where k is selected from normal distribution tables.

Values of k used to calculate percentiles in this report are:

Percentile	k
5	-1.645
10	-1.282
20	-0.842
30	-0.524
40	-0.253
50	0
60	+0.253
70	+0.524
80	+0.842
90	+1.282
95	+1.645

APPENDIX G

CONFIDENCE LIMITS OF
OCTANE NUMBER REQUIREMENT DISTRIBUTIONS

CONFIDENCE LIMITS OF OCTANE NUMBER REQUIREMENT DISTRIBUTIONS

Octane number requirements of vehicles presented in this Survey are determined at the levels that satisfy certain percentages of specific vehicle populations. In many cases, the recorded octane number requirement is followed by a plus and minus limit, referred to as the confidence interval. These limits are expected to bound the true requirement of the population represented by the test vehicles 95 percent of the time in replicate testing of the same number of test vehicles.

At the 50 percent satisfaction level, the 95 percent confidence interval is calculated as follows:

$$CI = \pm ts/(n)^{1/2}$$

where t = Students t at the proper number of degrees of freedom*

s = Standard deviation, calculated directly from the data or estimated as the difference between the 84.16th and 50th percentiles (assuming normal distribution)

n = Number of vehicles in population.

At other satisfaction levels:

$$CI = \pm ts \left(1/n + k^2/[2(n-1)]\right)^{1/2}$$

At the 90 percent satisfaction level, k = 1.2817. For other satisfaction levels, appropriate values for k may be found in the standard statistical tables.

Degrees of Freedom**	t	Degrees of Freedom**	t
1	12.706	18	2.101
2	4.393	19	2.093
3	3.182	20	2.086
4	2.776	21	2.080
5	2.571	22	2.074
6	2.447	23	2.069
7	2.365	24	2.064
8	2.306	25	2.060
9	2.262	26	2.056
10	2.228	27	2.052
11	2.201	28	2.048
12	2.179	29	2.045
13	2.160	30	2.042
14	2.145	40	2.021
15	2.131	60	2.000
16	2.120	120	1.980
17	2.110	∞	1.960

* Distribution of t for probability = 0.05.
** Degrees of Freedom = (n-1).

TABLE G-I

95% CONFIDENCE LIMITS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS

1985 Weighted Population Groups

Population	Fuel	No. Veh.	t	Standard Dev. (R+M)/2	Standard Dev. RON	Standard Dev. MON	95% Confidence Limits (R+M)/2 50%	(R+M)/2 90%	RON 50%	RON 90%	MON 50%	MON 90%
US and Imported Vehicles												
Includes Knock Sensor	PR	374	1.966	3.18	3.18	3.18	0.32	0.44	0.32	0.44	0.32	0.44
Maximum (High-Borderline)	FBRU	374	1.966	2.80	3.47	2.12	0.28	0.38	0.35	0.48	0.22	0.29
Requirements	FBRSU	374	1.966	3.04	3.57	2.50	0.30	0.42	0.36	0.49	0.25	0.34
Includes Knock Sensor	PR	347	1.967	3.58	3.58	3.58	0.38	0.51	0.38	0.51	0.38	0.51
Minimum (Low-Borderline)	FBRU	347	1.967	3.02	3.78	2.25	0.32	0.43	0.40	0.54	0.24	0.32
Requirements	FBRSU	347	1.967	3.35	3.99	2.71	0.35	0.48	0.42	0.57	0.29	0.39
US and Imported Cars												
Includes Knock Sensor	PR	342	1.967	3.84	3.84	3.84	0.41	0.55	0.41	0.55	0.41	0.55
Maximum (High-Borderline)	FBRU	342	1.967	2.92	3.63	2.20	0.31	0.42	0.39	0.52	0.23	0.32
Requirements	FBRSU	342	1.967	3.28	3.85	2.70	0.35	0.47	0.41	0.55	0.29	0.39
Includes Knock Sensor	PR	318	1.968	3.87	3.87	3.87	0.43	0.58	0.43	0.58	0.43	0.58
Minimum (Low-Borderline)	FBRU	318	1.968	2.98	3.74	2.21	0.33	0.44	0.41	0.56	0.24	0.33
Requirements	FBRSU	318	1.968	3.36	4.02	2.71	0.37	0.50	0.44	0.60	0.30	0.40
US Vehicles												
Includes Knock Sensor	PR	309	1.968	3.17	3.17	3.17	0.36	0.48	0.36	0.48	0.36	0.48
Maximum (High-Borderline)	FBRU	309	1.968	3.04	3.73	2.34	0.34	0.46	0.42	0.56	0.26	0.35
Requirements	FBRSU	309	1.968	3.26	3.82	2.71	0.36	0.50	0.43	0.58	0.30	0.41
Includes Knock Sensor	PR	282	1.968	3.77	3.77	3.77	0.44	0.60	0.44	0.60	0.44	0.60
Minimum (Low-Borderline)	FBRU	282	1.968	3.58	4.45	2.72	0.42	0.57	0.52	0.70	0.32	0.43
Requirements	FBRSU	282	1.968	3.78	4.49	3.06	0.44	0.60	0.53	0.71	0.36	0.48

TABLE G-I
(Continued)

95% CONFIDENCE LIMITS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS

1985 Weighted Population Groups

Population	Fuel	No. Veh.	t	Standard Dev. (R+M)/2	Standard Dev. RON	Standard Dev. MON	95% Confidence Limits (R+M)/2 50%	(R+M)/2 90%	RON 50%	RON 90%	MON 50%	MON 90%
US Cars												
Includes Knock Sensor	PR	282	1.968	3.92	3.92	3.92	0.46	0.62	0.46	0.62	0.46	0.62
Maximum (High-Borderline)	FBRU	282	1.968	3.12	3.86	2.39	0.36	0.50	0.45	0.61	0.28	0.38
Requirements	FBRSU	282	1.968	3.62	4.25	3.00	0.42	0.58	0.50	0.67	0.35	0.48
Includes Knock Sensor	PR	258	1.969	4.15	4.15	4.15	0.51	0.69	0.51	0.69	0.51	0.69
Minimum (Low-Borderline)	FBRU	258	1.969	3.32	4.15	2.48	0.41	0.55	0.51	0.69	0.30	0.41
Requirements	FBRSU	258	1.969	3.84	4.57	3.11	0.47	0.64	0.56	0.76	0.38	0.52
Imported Vehicles												
Includes Knock Sensor	PR	65	1.997	3.31	3.31	3.31	0.82	1.11	0.82	1.11	0.82	1.11
Maximum (High-Borderline)	FBRU	65	1.997	2.08	2.65	1.52	0.52	0.70	0.66	0.89	0.38	0.51
Requirements	FBRSU	65	1.997	2.30	2.72	1.87	0.56	0.77	0.67	0.91	0.46	0.63
Includes Knock Sensor	PR	65	1.997	3.09	3.09	3.09	0.76	1.04	0.76	1.04	0.76	1.04
(Minimum (Low-Borderline)	FBRU	65	1.997	2.00	2.56	1.44	0.50	0.67	0.63	0.86	0.36	0.48
Requirements	FBRSU	65	1.997	2.25	2.68	1.82	0.56	0.75	0.66	0.90	0.45	0.61
Knock Sensor Vehicles Only												
Includes Knock Sensor	PR	103	1.982	3.79	3.79	3.79	0.74	1.00	0.74	1.00	0.74	1.00
Maximum (High-Borderline)	FBRU	103	1.982	3.36	4.07	2.64	0.66	0.89	0.80	1.08	0.51	0.70
Requirements	FBRSU	103	1.982	3.48	4.10	2.86	0.68	0.92	0.80	1.08	0.56	0.76
Includes Knock Sensor	PR	76	1.991	5.16	5.16	5.16	1.18	1.59	1.18	1.59	1.18	1.59
Minimum (Low-Borderline)	FBRU	76	1.991	3.70	4.79	2.60	0.84	1.14	1.09	1.48	0.59	0.80
Requirements	FBRSU	76	1.991	3.57	4.47	2.67	0.82	1.10	1.02	1.38	0.61	0.83

TABLE G-II

95% CONFIDENCE LIMITS FOR MAXIMUM (R+M)/2, RON, AND MON REQUIREMENTS

1985 Select Models

Model	Fuel	n	t	Std.Dev. (s) (R+M)/2	95% Confidence Limits, (R+M)/2 50% Satis.	95% Confidence Limits, (R+M)/2 90% Satis.	Std.Dev. (s) RON	95% Confidence Limits, RON 50% Satis.	95% Confidence Limits, RON 90% Satis.	Std.Dev. (s) MON	95% Confidence Limits, MON 50% Satis.	95% Confidence Limits, MON 90% Satis.
DHD T22A3/KED T22A3/	PR	12	2.201	3.061	1.94	2.68	3.061	1.94	2.68	3.061	1.94	2.68
KHD T22A3/KKD T22A3/	FBRU	12	2.201	2.924	1.86	2.56	3.671	2.33	3.21	2.178	1.38	1.91
PKD T22A3	FBRSU	12	2.201	3.432	2.18	3.00	4.146	2.63	3.63	2.721	1.73	2.38
ME4 216A3/OE4 216A3	PR	11	2.228	1.794	1.21	1.66	1.794	1.21	1.66	1.794	1.21	1.66
	FBRU	11	2.228	2.097	1.41	1.94	2.548	1.71	2.36	1.649	1.11	1.53
	FBRSU	11	2.228	2.475	1.66	2.29	2.844	1.91	2.64	2.106	1.41	1.95
MTX T23A3/OTX T23A3	PR	15	2.145	2.044	1.13	1.55	2.044	1.13	1.55	2.044	1.13	1.55
	FBRU	15	2.145	1.780	0.99	1.35	2.264	1.25	1.72	1.298	0.72	0.99
	FBRSU	15	2.145	1.710	0.95	1.30	2.085	1.15	1.58	1.337	0.74	1.02
HNL P30A3/INL P30A3/	PR	17	2.120	3.105	1.60	2.18	3.105	1.60	2.18	3.105	1.60	2.18
LNL P30A3, Knock Sensor	FBRU	17	2.120	2.558	1.32	1.80	3.178	1.63	2.24	1.940	1.00	1.36
Maximum (High-Borderline)	FBRSU	17	2.120	3.151	1.62	2.22	3.750	1.93	2.64	2.560	1.32	1.80
HNL P30A3/INL P30A3/	PR	16	2.132	2.762	1.47	2.02	2.762	1.47	2.02	2.762	1.47	2.02
LNL P30A3, Knock Sensor	FBRU	16	2.132	2.242	1.19	1.64	2.811	1.50	2.05	1.674	0.89	1.22
Minimum (Low-Borderline)	FBRSU	16	2.132	2.858	1.52	2.09	3.487	1.86	2.55	2.231	1.19	1.63

TABLE G-II
(CONTINUED)

95% CONFIDENCE LIMITS FOR MAXIMUM (R+M)/2, RON, AND MON REQUIREMENTS

1985 Select Models

Model	Fuel	n	t	Std.Dev. (s) (R+M)/2	95% Confidence Limits, (R+M)/2 50% Satis.	95% Confidence Limits, (R+M)/2 90% Satis.	Std.Dev. (s) RON	95% Confidence Limits, RON 50% Satis.	95% Confidence Limits, RON 90% Satis.	Std.Dev. (s) MON	95% Confidence Limits, MON 50% Satis.	95% Confidence Limits, MON 90% Satis.
IC3 P38A4/LC3 P38A4	PR	14	2.160	5.225	3.02	4.14	5.225	3.02	4.14	5.225	3.02	4.14
Knock Sensor, Maximum	FBRU	14	2.160	4.709	2.72	3.73	5.726	3.31	4.54	3.697	2.13	2.93
(High-Borderline)	FBRSU	14	2.160	5.003	2.89	3.97	5.906	3.41	4.68	4.106	2.37	3.25
IC3 P38A4/LC3 P83A4	PR	13	2.179	4.388	2.65	3.65	4.388	2.65	3.65	4.388	2.65	3.65
Knock Sensor, Minimum	FBRU	13	2.179	3.469	2.10	2.88	4.176	2.52	3.47	2.769	1.67	2.30
(Low-Borderline)	FBRSU	13	2.179	3.932	2.38	3.27	4.718	2.85	3.92	3.153	1.91	2.62
HGA 238A3/IGA 238A3/	PR	11	2.228	3.676	2.47	3.41	3.676	2.47	3.41	3.676	2.47	3.41
LGA 238A3, Knock Sensor	FBRU	11	2.228	2.261	1.52	2.10	2.883	1.94	2.67	1.640	1.10	1.52
Maximum (High-Borderline)	FBRSU	11	2.228	2.091	1.40	1.94	2.598	1.75	2.41	1.586	1.07	1.47
IBY 450A4/LBY 450A4	PR	12	2.201	1.881	1.20	1.65	1.881	1.20	1.65	1.881	1.20	1.65
	FBRU	12	2.201	1.768	1.12	1.55	2.151	1.37	1.88	1.386	0.88	1.21
	FBRSU	12	2.201	2.043	1.30	1.79	2.392	1.52	2.09	1.698	1.08	1.49
IJP T20A3/LJP T20A3/	PR	13	2.179	3.406	2.06	2.83	3.406	2.06	2.83	3.406	2.06	2.83
NJP T20A3	FBRU	13	2.179	4.581	2.77	3.81	5.598	3.38	4.65	3.565	2.15	2.96
	FBRSU	13	2.179	3.648	2.20	3.03	4.407	2.66	3.66	2.894	1.75	2.40
GJW P28A3/NJW P28A3	PR	11	2.228	2.513	1.69	2.33	2.513	1.69	2.33	2.513	1.69	2.33
	FBRU	11	2.228	2.695	1.81	2.50	3.226	2.17	2.99	2.167	1.46	2.01
	FBRSU	11	2.228	2.727	1.83	2.53	3.338	2.24	3.09	2.119	1.42	1.96

APPENDIX H

SPEED RANGE DATA

TABLE H-I - SPEED RANGE DATA

OBS NO	LAB NO	MODEL CODE	EMC T	KSE N	H/L	C.R.	A I R	SPK AS RCD	ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
200	28	BAB T19M5	F	Y	H	10.0	Y	+ 6	+ 6	8341	70	30.39	50	L	82.0	85.0	83.5	82.0	81.0	79.0	77.0	76.0	L	L	L
317	40	DGE TP22A3	F	Y	H	8.1	Y	+12	+12	6195	49	29.98	37								91.5	93.0	93.0	92.5	92.5
43	8	DHD T22A3	F	N		9.0	Y	+12	+12	7682	80	30.02	78				83.5	84.0	83.2	82.5	82.0	81.0			
279	5	DHD T22A3	F	N		9.0	Y	+12	+12	6584	70	29.97	62				89.5	91.0	91.0	90.5	90.0	89.5	88.5	87.5	86.0
327	46	DHD T22A3	F	N		9.0	Y	+12	+12	6070	80	29.62	86					86.0	87.0	86.5	85.5				
204	28	DHE TP22A3	F	Y	H	8.1	Y	+12	+12	9571	70	29.18	50							94.0	90.5	89.5	87.5	87.0	85.5
206	28	DHE TP22A3	F	Y	H	8.1	Y	+12	+12	9688	70	29.07	50					90.0	92.5	93.0	92.5	91.0	89.0	88.0	86.0
336	47	DHE TP22A3	C	Y	H	8.1	Y	+12	+12	8500	70	30.15	40									93.0	93.0	92.5	
30	29	GC8 T41A4	F	N		8.5	Y	+10	+10	10196	70	30.30	58					87.0	87.5	87.0	86.0	84.0	82.5		
65	8	GC8 T41A4	A	N		8.5	Y	+10	+10	8198	83	29.74	112		81.0	82.0	79.5	78.0							
272	7	GC8 T41A4	F	N		8.5	Y	+13	+10	25916	70	30.48	54		83.0	84.0	81.3	84.5	86.5	86.0	85.0	84.0	82.8	81.5	80.0
325	40	GC8 T41A4	F	N		8.5	Y	+10	+10	9265	52	29.97	39		85.0	88.5	88.0	87.5	86.5	86.0					
428	26	GC8 T41A4	F	N		8.5	Y	+12	+10	33238	76	29.97	96		L	78.5	79.0	79.0	78.5	77.5	L	L	L	L	L
173	41	GE8 T41A4	C	N		8.5	Y	+10	+10	6747	66	30.39	55				82.5	84.0	85.0	85.0	85.0	84.5	84.0	83.0	81.5
273	7	GE8 T41A4	F	N		8.5	Y	+10	+10	8410	72	30.19	58				78.0	81.0	84.2	84.8	83.0	81.8	80.6	79.8	78.9
159	47	GJW P28A3	C	N		8.9	Y	+10	+10	9500	70	30.08	50					82.0	83.5	84.0	84.0	84.5	85.0	85.0	85.0
194	47	GJW P28A3	C	N		8.9	Y	+ 6	+10	6500	70	29.82	50				79.5	80.5	81.0	81.5	82.0	82.5	83.5	88.0	88.0
195	47	GJW P28A3	C	N		8.9	Y	+10	+10	7400	70	29.99	50	L	L	L	77.5	81.0	81.0	81.0	81.0	81.0	81.0	81.0	81.0
196	47	GJW P28A3	C	N		8.9	Y	+10	+10	7000	70	30.21	39				81.0	82.0	82.5	82.5	83.0	83.0	83.5	83.5	84.0
197	47	GJW P28A3	C	N		8.9	Y	+10	+10	9200	70	30.28	36				83.5	84.5	85.0	85.0	85.5	86.0	86.0	86.0	86.0
343	60	GJW P28A3	F	N		8.9	Y	+ 8	+10	8550	70	30.18	50		79.3	80.5	81.5	82.3	82.9	82.0	81.2	80.2	79.0	78.0	76.8
352	62	GJW P28A3	F	N		8.9	Y	+10	+10	8370	72	30.20	50			78.3	80.0	81.0	80.9	80.5	79.8	78.8	77.4	76.0	
353	62	GJW P28A3	F	N		8.9	Y	+10	+10	8000	72	30.16	56			77.4	79.6	81.8	82.6	81.6	80.3	79.0	77.3	76.0	
447	46	GK8 T41A4	F	N		8.5	Y	+10	+10	12680	80	30.70	64			82.0	85.0	85.5							
10	29	HAR T25A3	F	N		9.0		+ 8	+ 8	24213	70	30.09	56					81.0	85.5	86.0	85.0	82.0			
54	8	HAW P28A3	F	N		8.9	Y	+10	+10	10955	77	30.20	41									82.0	83.5	85.0	86.0
415	26	HAW P28A3	F	N		8.9	Y	+10	+10	9415	72	30.24	54								82.5	85.0	86.0	86.0	85.5
55	8	HGA 238A3	F	Y	H	8.0	Y	+15	+15	11565	74	29.67	104		82.5	83.0									

TABLE H-I - SPEED RANGE DATA

OBS NO	LAB NO	MODEL CODE	EMC	KSET	H/L	C.R.	AIR	SPK ADV RCD	SPK ADV TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
11	29	HJ0	T19A3	F	N	9.0	Y	+ 8	+ 8	25461	70	30.28	58					83.0	85.0	87.0	88.0	88.0	86.0	84.0	83.0
56	8	HJ0	T19A3	F	N	9.0	Y	+ 8	+ 8	14229	72	29.98	26					84.0	85.5	83.0					
57	8	HJ0	T18A3	F	N	9.0	Y	+ 8	+ 8	14860	78	29.60	92				83.5	84.0	82.5	81.0	80.0				
183	7	HJ0	T18A3	F	N	9.0	Y	+ 8	+ 8	8900	70	30.32	48							89.8	90.8	90.8	90.1	89.4	88.3
330	46	HJ0	T18A3	F	N	9.0	Y	+ 5	+ 8	6937	80	29.40	75						81.5	81.5	80.5	78.0			
58	8	HNL	P30A3	C	Y	H	9.0	Y		19352	80	30.01	41			82.0	84.5	84.0							
79	41	HNL	P30A3	C	Y	L	9.0	Y		6711	75	30.04	57		77.0	81.0	82.0	81.5	79.5	76.0					
81	41	HNL	P30A3	C	Y	L	9.0	Y		10965	70	30.10	56		75.0	82.0	84.0	83.5	82.0	79.0	75.0				
293	5	HNL	P30A3	F	Y	H	9.0	Y		9199	67	29.89	58			83.5	84.0	85.0	87.0	87.0	85.0	84.0	83.5		
416	26	HNL	P30A3	F	Y	H	9.0	Y		10883	65	30.24	30		86.0	88.0	94.0	94.0	94.0	90.0	87.5	87.0	86.5	86.0	
441	46	HNL	P30A3	F	Y	H	9.0	Y		9634	73	29.27	80				87.5	88.0	87.0	86.0					
322	40	HP9	P28A3	F	N		8.5	Y	+10	+10	11353	33	30.32	27					88.0	89.0	89.5	90.0	90.0	90.0	89.0
362	47	HP9	P28A3	C	N		8.5	Y	+10	+10	17800	70	30.00	48				84.0	85.0	85.5	86.5	88.0	88.0	87.5	87.0
15	29	IA3	P38A4	F	Y	H	8.0	Y	+15	+15	9471	70	30.20	60						84.5	84.0	82.0	81.0	80.0	
184	7	IA3	P38A4	F	Y	H	8.0	Y	+15	+15	6885	70	30.15	56						83.0	86.1	88.2	87.0	84.0	80.0
59	8	IAE	230A3	F	Y	H	8.4	Y	+15	+15	14170	82	29.89	66			80.0	84.5	82.0						
296	5	IAE	230A3	F	Y	H	8.4	Y	+15	+15	15230	68	29.97	51			89.5	90.0	90.0	89.5	89.5	89.0			
419	26	IAE	230A3	F	Y	H	8.4	Y	+15	+15	11275	64	29.85	54			L	78.0	77.5	76.5	L	L	L	L	L	L
12	29	IAE	230A4	F	Y	H	8.4	Y	+15	+15	7047	70	30.28	56						87.5	86.0	83.5			
14	29	IAR	T25A3	F	N		9.0	Y	+ 8	+ 8	21834	70	30.10	58						86.5	89.5	90.0	89.0		
17	29	IBY	450A4	F	N		8.0	Y	+20	+20	15229	70	30.28	56			89.0	93.0	93.0	91.5	90.0	89.0	88.0		
60	8	IBY	450A4	F	N		8.0	Y	+20	+20	10573	80	30.21	29				86.0	88.0						
61	8	IBY	450A4	F	N		8.0	Y	+20	+20	17762	78	30.02	40				87.0	88.0	86.5	84.0				
185	7	IBY	450A4	F	N		8.0	Y	+20	+20	6966	70	30.48	49		83.6	86.0	87.3	90.3	89.5	88.3	87.3	86.2	85.0	84.0	82.6
266	7	IBY	450A4	F	N		8.0	Y	+20	+20	10377	68	30.42	47					88.0	88.7	87.0	86.0	84.9	83.9	83.0	82.1
363	47	IBY	450A4	C	N		8.0	Y	+18	+20	7500	70	30.21	43	L	L	82.5	83.5	88.0	87.0	86.0	84.5	82.0	L	L	L
420	26	IBY	450A4	F	N		8.0	Y	+20	+20	13587	71	30.38	43				88.5	89.0	88.5	87.5	85.5	84.0	82.0	80.0	
18	29	IC3	P38A4	F	Y	H	8.0	Y	+15	+15	17192	70	30.09	63				84.5	87.0	86.5	84.0				

TABLE H-I - SPEED RANGE DATA

OBS NO	LAB NO	MODEL CODE	EMC T	EKS E N	H / L	C.R.	A I R	SPK ADV AS RCD	SPK ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
83	41	IC3	P38A4	C	Y	L	8.0	Y	+15	+15	6861	72	29.80	60		77.5	78.0	76.5								
267	7	IC3	P38A4	F	Y	H	8.0	Y	+17	+15	7002	74	29.96	73				L	L	77.1	78.6	76.8	L	L	L	L
421	26	IC3	P38A4	F	Y	H	8.0	Y	+15	+15	15393	78	29.80	91			85.0	85.0	85.0	85.0	85.0	85.0	85.0			
423	26	IC3	P38A4	F	Y	H	8.0	Y	+15	+15	20002	77	29.91	105	L	L	82.0	78.0	76.5	76.0	L	L	L	L	L	L
20	29	IGA	238A3	F	Y	H	8.0	Y	+15	+15	18237	70	30.30	58				89.5	89.0	88.5	87.0	86.5	85.5			
62	8	IGA	238A3	F	Y	H	8.0	Y	+15	+15	21886	80	29.81	45				87.0	86.0							
63	8	IGA	238A3	F	Y	H	8.0	Y	+15	+15	8810	80	30.02	84			86.0	83.0								
84	41	IGA	238A3	C	Y	H	8.0	Y	+15	+15	18427	74	30.09	60			83.0	85.0	84.5	83.0	81.0					
156	47	IGA	238A3	C	Y	H	8.0	Y	+15	+15	11500	70	29.96	74			90.0	91.0	85.5	83.0	78.0					
443	46	IGA	238A3	F	Y	H	8.0	Y	+12	+15	17980	74	29.95	54				84.0	86.0	80.5	78.0					
186	7	IGY	450A3	F	N		8.0	Y	+20	+20	6280	71	30.21	50		77.0	80.8	83.0	84.6	84.8	83.0	81.5	79.6	77.5	L	
268	7	IJO	T18A3	F	N		9.0	Y	+ 8	+ 8	6254	70	30.20	53				84.5	87.0	89.4	87.8	86.8	87.4	88.8	87.5	85.5
22	29	IJP	T20A3	F	N		9.3	Y	+ 6	+ 6	14984	70	30.28	58						82.5	85.0	86.5	86.0			
23	29	INL	P30A3	F	Y	H	9.0	Y			13291	70	30.41	58							86.5	88.5	88.0	86.5	84.5	
86	41	INL	P30A3	C	Y	L	9.0	Y			15029	73	30.10	58			78.0	80.0	79.5	77.0						
25	29	INU	T25A3	F	N		9.0	Y	+ 8	+ 8	11863	70	30.09	58								83.0	80.0			
436	46	KED	T22A3	F	N		9.0	Y	+14	+12	19950	84	29.41	110					85.0	85.0	84.0	83.5				
122	28	KHD	T22A3	F	N		9.0	Y	+12	+12	10671	70	29.09	50	L	L	L	77.5	82.0	83.5	84.0	82.5	81.0	79.5	78.0	L
316	40	KHD	T22A3	F	N		9.0	Y	+12	+12	8860	50	29.40	38		88.5	89.5	90.5	91.5	92.0	92.0	91.5	90.5	88.5		
40	8	KHE	TP22A3	A	Y	H	8.1	Y	+12	+12	6895	73	29.29	67						87.0	86.0					
41	8	KKC	222A3	F	N		9.0	Y	+10	+10	22194	80	30.19	37					80.0	83.5	84.0					
70	41	KKC	222A3	C	N		9.0	Y	+10	+10	21270	75	30.10	57						82.5	85.0	86.0	85.5	84.0	82.0	
3	29	KKD	T22A3	F	N		9.0	Y	+ 6	+ 6	10431	70	29.98	56					86.0	85.5	84.5	83.5	82.5			
341	60	KKD	T22A3	F	N		9.0	Y	+12	+12	9636	72	30.54	58					85.5	88.5	89.0	87.0	85.5	83.9	82.6	81.2
176	7	KLA	216M4	F	N		8.8	N	+12	+12	10635	72	30.47	64		79.0	81.2	83.3	85.0	85.0	83.5	81.8	80.0	78.0		
42	8	KLC	222A3	A	N		9.0	Y	+10	+10	22851	79	29.29	52							82.0	85.5	83.0	81.5	80.5	
269	7	LA3	P38A4	F	Y	H	8.0	Y	+15	+15	6682	68	30.29	58	87.0	85.4	82.4	82.6	84.5	84.8	83.0	81.0	78.5			
26	29	LAE	230A3	F	Y	H	8.4	Y	+15	+15	30637	70	30.28	56					86.0	86.5	84.0	82.5				

TABLE H-I - SPEED RANGE DATA

OBS NO	LAB NO	MODEL CODE	EMC T	EKS E	H / N	L	C.R.	A I R	SPK AS RCD	ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
187	7	LAE	230A3	F	Y	H	8.4	Y	+15	+15	28702	72	30.34	58	87.0	90.0	89.3	88.1	87.0	85.2	83.6	81.7	80.0			
302	5	LAR	T25A3	F	N		9.0	Y	+ 8	+ 8	6324	72	30.34	53			87.0	88.0	88.0	87.5	87.0	86.0				
445	46	LAR	T25A3	F	N		9.0	Y	+11	+ 8	18740	80	29.61	64			78.0	82.0	81.0	79.5	79.0	78.5	78.0	78.0	78.0	78.0
303	5	LBY	450A4	F	N		8.0	Y	+20	+20	21109	68	30.33	55			88.0	89.5	91.0	91.0	89.5	89.5	89.0	87.0		
425	26	LBY	450A4	F	N		8.0	Y	+20	+20	7696	71	30.18	73			82.0	86.0	87.0	87.0	85.0					
88	41	LBY	450A4	C	Y	L	8.0	Y	+20	+20	13902	68	30.16	57				80.0	81.0	81.0	80.5	80.0	79.0			
134	28	LC3	P38A4	F	Y	H	8.0	Y	+15	+15	9711	70	29.28	50	L	78.5	82.0	80.5	79.0	77.5	76.5	L	L	L	L	L
426	26	LC3	P38A4	F	Y	H	8.0	Y	+15	+15	12762	71	30.16	69			85.0	85.0	85.0	85.0	84.5	84.5	84.0			
446	46	LEY	450A4	F	N		8.0	Y	+20	+20	8856	84	29.55	100		78.0										
188	7	LGA	238A3	F	Y	H	8.0	Y	+15	+15	6458	74	30.41	55			80.4	79.0	77.3	L						
304	5	LGA	238A3	F	Y	H	8.0	Y	+14	+14	11053	69	30.05	58			86.0	89.0	89.0	89.0	86.0	84.0	83.5	83.0	82.5	82.0
28	29	LNL	P30A3	F	Y	H	9.0				9528	70	30.10	58					84.0	87.5	89.0	89.0	85.0	84.0		
90	41	LNL	P30A3	C	Y	L	9.0	Y			23641	73	30.03	56			84.0	84.0	84.0	83.5	83.5	83.0	83.0	82.5	82.0	
138	28	LNL	P30A3	F	Y	H	9.0	Y			10436	70	29.37	50		L	76.0	78.0	84.0	87.0	82.0	80.0	78.0			
258	41	LNL	P30A3	C	Y	L	9.0	Y			11643	69	30.32	55			83.0	83.0	83.0	82.5	82.5	82.0	82.0	81.5	81.0	81.0
323	40	LNL	P30A3	F	Y	H	9.0	N			13980	60	29.97	50			86.0	86.5	86.0							
270	7	LNU	T25A3	F	N		9.0	Y	+ 8	+ 8	7758	68	30.09	56		84.0	86.0	83.4	80.8	80.6	83.0	86.0	87.3	86.2	85.0	83.5
64	8	LXR	T25A3	F	N		9.0	Y	+ 8	+ 8	8998	80	29.88	74				88.5	88.0	86.5	85.0					
271	7	LXR	T25A3	F	N		9.0	Y	+ 8	+ 8	10577	71	30.36	45			89.5	92.5	91.2	89.0	86.6	88.8	86.0	84.2	82.8	81.8
335	46	LXR	T25A3	F	N		9.0	Y	+12	+ 8	19147	75	29.10	104						82.5	84.0	84.0	83.0			
342	60	LXW	P28A3	F	N		8.9	Y	+10	+10	6451	70	30.18	58		82.0	85.0	84.8	83.4	86.5	86.5	84.3	82.6	81.0		
179	7	ME4	216A3	F	N		9.0	Y	+14	+14	12461	73	30.10	70					91.4	90.0	88.8	87.5	86.7	85.8	85.0	84.8
46	8	MS3	T38A3	F	N		8.7	Y	+ 7	+ 7	24063	79	29.85	61					86.0	85.5	85.0	84.5	84.0			
440	46	MS3	T38A3	F	N		8.7	Y	+10	+ 7	12163	80	29.51	70	L	L	L	L	L	L	L	L	L	L	L	L
439	46	MSF	T50A4	F	N		8.4	Y	+ 8	+ 8	9185	80	29.12	84		86.5	87.0									
73	41	MTX	T23A3	C	N		9.0	Y	+10	+10	7178	73	29.89	62		89.0	89.5	90.0	90.0	90.0	90.0	89.5	89.0			
351	62	MTX	T23A3	F	N		9.0	Y	+10	+10	9625	68	30.36	48				91.0	92.8	91.0	89.2	87.7	86.5	85.5	85.0	85.0
172	41	MTX	T23M5	C	N		9.0	Y	+10	+10	9036	65	30.18	70			81.0	83.0	84.0	84.0	84.0	83.5	83.5	83.0	82.0	81.5

TABLE H-I - SPEED RANGE DATA

OBS NO	LAB NO	MODEL CODE	EMC T	EKS E N	H / L	C.R.	A I R	SPK ADV RCD	SPK ADV TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
75	41	NAR T25A3	C	N		9.0	Y	+ 8	+ 8	7812	76	30.05	56			90.0	93.0	91.5	89.0						
288	5	NAR T25A3	F	N		9.0	Y	+ 8	+ 8	10580	69	29.55	54			88.0	88.0	87.5	87.0	87.0	86.5	86.5	86.0	86.0	
4	29	NAW P28A3	F	N		8.9	Y	+10	+10	6100	70	30.10	58						80.5	82.0	80.5	80.0			
154	47	NAW P28A4	C	N		8.9	Y	+10	+10	6000	70	30.11	50								83.5	84.0	84.0	83.0	82.5
361	47	NAW P28A4	C	N		8.9	Y	+10	+10	6120	70	30.26	41			82.0	82.5	82.5	83.0	83.0	83.5	83.5	84.0	84.0	84.5
5	29	NAX 228A3	F	N		8.5	Y	+10	+10	16319	70	30.41	58					86.0	88.5	87.0	86.5	85.5	84.0		
47	8	NAX 228A3	F	N		8.5	Y	+10	+10	15764	79	30.08	52			87.0	86.5	85.0							
48	8	NAX 228A3	F	N		8.5	Y	+10	+10	16986	78	29.88	44			88.0	87.0	86.0	84.5						
181	7	NAX 228A3	F	N		8.5	N	+10	+10	15365	72	30.14	58	87.6	88.9	88.5	87.8	87.0	85.8	84.6	83.0	81.5	79.6	78.0	
289	5	NAX 228A3	F	N		8.5	Y	+ 8	+ 8	18322	67	30.30	60		83.5	86.0	86.0	86.0	85.5	84.5	84.0	84.0	83.5	83.0	83.0
6	29	NBH 450A4	F	Y	H	9.5	Y	0	0	14766	70	30.38	56				92.5	92.0	90.5	89.0	88.0				
49	8	NBH 450A4	F	Y	H	9.5	Y	0	0	8484	80	30.10	64				88.5	90.0							
263	7	NBH 450A4	F	Y	H	9.5	Y	0	0	18218	70	30.46	44	94.0	93.0	89.9	91.5	93.8	94.8	94.4	93.3	91.6	89.0	85.2	
50	8	NBZ T43A3	F	Y	H	9.3	Y	0	0	6338	76	30.35	31					82.0	80.5	79.0					
51	8	NBZ T43A3	F	Y	H	9.3	Y	0	0	6454	75	29.84	37				80.5	84.0	83.5						
410	26	NBZ T43A3	F	Y	H	9.3	Y	0	0	7752	80	29.84	152		82.0	82.0	82.0	82.0	82.0	81.0					
412	26	NBZ T43A3	F	Y	H	9.3	Y	0	0	7104	78	30.32	87		92.0	91.0	87.5	85.5	84.0	83.0	82.5	82.0	82.0		
129	28	NBZ T43A4	F	Y	H	9.3	Y	0	0	10411	70	29.18	50	82.0	82.5	L									
290	5	NFH 450A4	F	Y	H	9.5	Y	0	0	7280	69	30.13	66			90.0	90.0	88.0	87.5	87.5	87.0	87.0	87.0	87.0	87.0
328	46	NFH 450A4	F	Y	H	9.5	Y	0	0	8863	80	29.53	90		86.0	84.5									
76	41	NFS P28A4	C	N		8.9	Y	+10	+10	14840	76	30.04	58			86.0	86.0	86.0	86.0	86.0	85.5	85.5	85.0	84.5	
7	29	NGZ T43A3	F	Y	H	9.3	Y	0	0	12959	70	30.41	58				90.5	90.0	88.5	87.0					
264	7	NGZ T43A4	F	Y	H	9.3	Y	+ 5	0	6753	73	30.24	54	82.9	83.5	81.0	82.6	84.5	85.4	85.5	84.4	83.0	80.8	78.5	
8	29	NJP T20A3	F	N		9.3	Y	+ 6	+ 6	11225	72	30.10	58				82.5	86.5	85.0	85.0	84.5	84.5	83.5		
52	8	NJP T20A3	F	N		9.3	Y	+ 6	+ 6	11448	78	29.98	77							80.0	82.5	79.0			
53	8	NJP T20A3	F	N		9.3	Y	+ 6	+ 6	10782	76	30.20	35									82.0	83.5	86.5	85.0
77	41	NJP T20A3	C	N		9.3	Y	+ 6	+ 6	16801	70	29.94	59									83.5	85.0	86.0	86.0
182	7	NJP T20A3	F	N		9.3	Y	+ 6	+ 6	20081	72	30.46	56						86.8	89.0	90.5	91.2	91.5	91.2	90.9

TABLE H-I - SPEED RANGE DATA

OBS NO	LAB NO	MODEL CODE	EMC T	EKSHE/N	L	C.R.	SPK ADV A I	R	AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
292	5	NJP	T20A3	F	N	9.3	Y	+	6	+ 6	9390	68	29.97	57		83.0	83.5	83.5	84.0	84.5	85.0	86.0	84.5	84.0	83.5	83.0
329	46	NJP	T20A3	F	N	9.3	Y	+	6	+ 6	7280	80	29.50	90								79.0	80.0			
414	26	NJP	T20A3	F	N	9.0	Y	+	6	+ 6	13952	76	30.07	112	L	L	L	L	L	L	76.5	78.0	78.0	78.0	78.0	78.0
265	7	NTC	216A3	F	N	9.0	N	+	8	+ 8	8341	72	29.75	50					85.0	88.5	88.9	87.8	86.9	86.0	85.2	84.5
9	29	NTC	216M4	F	N	9.0	N	+	6	+ 6	8188	70	30.15	56			83.0	86.0	86.0	85.0	84.0	83.0	82.0			
177	7	OE2	216M4	F	N	9.0	N	+	8	+ 8	10538	74	30.00	64			90.2	87.6	85.5	83.6	82.0	81.0	80.2	79.9		
282	5	OE2	216M4	F	N	9.0	N	+	8	+ 8	34679	72	29.92	53		89.5	89.0	88.5	87.5							
44	8	OE4	216A3	F	N	9.0	Y	+14		+14	26731	73	29.99	36			92.5	90.5	88.5	87.5	86.5					
208	28	OE4	216A3	F	N	9.0	Y	+14		+14	9125	70	29.41	50					90.0	89.5	86.0					
209	28	OE4	216A3	F	N	9.0	Y	+14		+14	9573	70	29.28	50		93.0	94.5	93.0	92.0	90.0	89.0	87.5	86.5	86.0		
405	26	OE4	216A3	F	N	9.0	Y	+14		+14	10171	76	30.07	50			91.0	90.5	90.0	90.0	89.5	88.5	88.0	87.0	86.0	85.0
406	26	OE4	216A3	F	N	9.0	Y	+14		+14	10200	73	30.07	54			90.5	91.0	92.0	92.0	91.5	90.5	90.0	89.5	89.0	
283	5	OE4	216M5	F	N	9.0	Y	+10		+12	7088	70	29.63	52				89.0	91.0	90.5	89.5	89.0				
319	40	OF3	T38A3	F	Y	H	8.7	Y	+10	+10	16884	64	29.91	72			82.0	84.0	82.5							
71	41	OL3	T38A3	C	N		8.7	Y	+	7	+ 7	20847	75	30.02	60			91.5	93.0	93.0	92.5	91.0	89.0			
284	5	OL3	T38A3	F	N		8.7	Y	+	8	+ 8	14549	70	30.40	60		89.5	90.5	91.0	91.0	90.5	89.5	88.5	87.5		
437	46	OL3	T38A3	F	N		8.7	Y	+	7	+ 7	26090	80	29.45	86			82.0	82.5	83.0	83.0	83.0	83.0	83.0	82.5	
123	28	OLA	123A3	F	N		9.5	Y	+10		+10	15539	70	29.07	50					87.0	91.0	89.0	88.5	87.5	86.0	84.5
407	26	OPF	T50A4	F	N		8.4	Y	+10		+10	9047	79	30.00	90		87.0	87.0	87.0	87.0	87.0	86.5	86.5	86.5	86.0	
438	46	OPF	T50A4	F	N		8.4	Y	+	8	+10	14306	80	29.72	86			87.5	88.0	88.0	86.5	85.0				
45	8	OTX	T23A3	F	N		9.0	Y	+10		+10	22914	78	30.01	77			90.5	89.0	87.5	86.5	86.0				
72	41	OTX	T23A3	C	N		9.0	Y	+10		+10	6048	72	29.98	57			89.0	90.0	91.0	91.0	91.0	90.0	89.0		
128	28	OTX	T23A3	F	N		9.0	Y	+10		+10	9703	70	29.48	50		88.5	90.0	91.0	92.5	92.0	91.0	89.5	88.5	87.5	86.5	85.5
178	7	OTX	T23A3	F	N		9.0	Y	+10		+10	11655	70	29.96	49			85.0	88.5	89.0	87.5	86.2	85.0	84.0	82.9	82.0	81.0
286	5	OTX	T23A3	F	N		9.0	Y	+10		+10	9605	72	30.18	48		89.5	89.0	87.5	87.0	87.0					
287	5	OTX	T23A3	F	N		9.0	Y	+10		+10	17459	70	29.94	60		89.0	91.0	91.0	90.5	90.0	90.0	89.5	89.0	88.0	87.5	87.0
408	26	OTX	T23A3	F	N		9.0	Y	+10		+10	8893	75	29.82	113			87.0	86.5	85.5	84.5	84.0	83.0	82.5	82.0	81.5	81.0
256	41	OTX	T23M5	C	N		9.0	N	+10		+10	6561	69	30.20	62				88.0	89.5	90.5	90.5	90.0	89.5	88.5	87.5	

TABLE H-I - SPEED RANGE DATA

OBS NO	LAB NO	MODEL CODE	EMC T	EKS E	H / N	L	C.R.	A I R	SPK AS RCD	ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
321	40	OTX	T23N5	F	N		9.0	N	+ 9	+10	6701	52	30.05	58						93.5	95.0	94.5				
69	41	PKC	222A3	C	N		9.0	Y	+10	+10	12942	74	29.84	61						85.5	88.0	89.0	88.5	87.0	84.0	
39	8	PKD	T22A3	A	N		9.0	Y	+12	+12	10853	69	30.19	46							82.0	83.5	85.0	83.5	82.5	
261	7	PKD	T22A3	F	N		9.0	N	+12	+12	6812	69	30.50	55						91.4	92.8	92.6	91.9	90.8	89.7	88.3
2	29	PLC	222A3	F	N		9.0		+ 6	+ 6	9403	70	29.98	55				85.0	88.0	88.0	87.5	87.0	86.0			
278	5	PLC	222A3	F	N		9.0	Y	+12	+12	11290	68	30.07	74				83.0	84.0	84.5	85.0	86.0	87.0	87.0	87.0	84.0
262	7	PLC	222M5	F	N		9.0	Y	+10	+10	8253	70	30.25	67		78.0	82.3	85.6	86.0	85.3	84.3	83.2	82.1	81.0	80.0	78.6
1	29	RAA	T17A3	F	Y	H	9.5	Y			9947	70	30.38	58							89.5	90.0	89.0	88.5	87.0	
120	28	RAA	T17A3	F	Y	H	9.5	Y			9500	70	29.15	50	L	L	L	77.0	79.0	81.0	78.5	76.5	L	L	L	L
202	28	RAA	T17A3	F	Y	H	9.5	Y			10097	70	29.15	50						83.5	85.5	84.5	83.0	82.0	81.5	80.0
315	40	RAD	T14A3		N		9.0	N			9755	32	30.32	21			88.0	91.5								
404	26	RAD	T14A3	F	N		9.0	Y			21003	78	30.05	120							89.0	89.0	89.0	89.0	87.0	86.0
326	46	RAD	T14M4	C	N		9.0	Y	+ 6	+ 6	32944	80	29.55	90					86.0	85.0	84.0					
277	5	RAD	T14M5	F	N		9.0	Y	+ 8	+ 8	18330	68	30.08	59			91.5	92.0	91.0	90.0	89.0	88.5	88.5	88.0	88.0	88.0
38	8	RBD	T14A3	C	N		9.0	Y			6285	75	30.09	29							92.0	93.5	92.0	90.0		
68	41	RBD	T14A3	C	N		9.0	Y			27356	71	30.02	58							88.0	90.5	91.0	89.0	86.0	
74	41	SPF	T50A4	C	N		8.4	Y	+10	+10	11581	74	30.04	59		88.5	89.0	89.0	89.0	88.5	88.0	88.0	87.5	87.0		
409	26	SPF	T50A4	F	N		8.4	Y	+10	+10	26869	79	29.96	119	L	94.5	93.0	88.5	84.0	79.0	76.0	L	L	L	L	L
450	46	ETA	224M5	F	N		8.3	Y	+ 3	+ 3	24154	80	29.72	73				82.0	82.0							
161	47	KTMT	252A3	C	N		8.7	Y	+ 6	+ 8	6050	70	30.00	46			86.0	89.5	91.0	91.0	89.5	88.0	87.0	86.0	85.0	84.0
308	5	NTLH	450A4	F	Y	H	9.2	N	+10	+10	41537	70	29.65	52		84.0	85.0	88.0	88.0	86.0	85.0	84.5	84.0	84.0		
449	46	NTLH	450A4	F	Y	H	9.2	Y	+ 4	+ 4	18946	80	29.41	85			85.0	84.0	82.0							
429	26	NTLN	443A3	F	Y	H	9.3	Y	0	0	18120	69	30.12	72				92.0	91.5	91.0	90.0	88.5	87.0	86.0	85.0	
448	46	OTLY	149A3	F	N		8.5	Y	+12	+10	11650	84	29.32	100					86.0	86.0	82.0					
307	5	OTMM	V250A3	F	N		8.3	N	+10	+10	9285	70	29.53	77			82.5	86.0	86.0	86.0	85.0	83.5	82.5	82.5	82.0	
31	29	OTSA	P23A4	F	N		9.5		+10	+10	8185	70	30.21	58					86.0	88.5	90.0	88.5	86.0			
91	41	OTSS	228M5	C	N		8.7	N	+10	+10	6192	70	30.16	58				87.5	89.0	86.5	86.0					
163	47	NUSB	228A4	C	N		8.5	Y	+10	+10	7760	70	29.90	50		82.0	90.5	90.5	89.5	88.5	87.5	86.5	85.0	84.0	83.0	82.0

TABLE H-I - SPEED RANGE DATA

OBS NO	LAB NO	MODEL CODE	EMC T	EKS E	H / N	L	C.R.	A I R	SPK RCD	ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
174	41	NUSB	228A4	C	N		8.5	Y	+10	+10	6363	64	30.36	58			94.0	94.0	93.5	93.0	93.0	92.5	92.0	91.5	91.0	90.5
275	7	NVLH	450A3	F	Y	H	9.2	N	+ 4	+ 4	7285	68	30.19	52			90.0	91.8	89.0	87.3	90.5	99.5	98.0	86.5	85.5	84.6
162	47	OVLG	250A4	C	N		8.4	Y	+ 8	+10	15580	70	30.03	46			92.0	92.0	91.5	90.5	90.0	88.0	86.0			
189	7	OVLY	149A3	F	N		8.5	N	+10	+10	11213	72	30.44	50		86.0	90.0	89.8	87.8	85.5	83.8	82.0				
274	7	PVSC	222M5	F	N		9.0	Y	+10	+10	6189	72	30.40	58				87.7	88.3	87.8	87.0	86.0	85.0	84.0	82.8	81.4
32	29	AU	P18M5	F	N		10.0	Y	+12	+12	8216	72	30.09	58				87.0	90.5	89.5	88.0	86.5				
33	29	B	P18A3	F	N		8.5	Y	+ 6	+ 6	9551	70	29.48	62								83.0	84.0	82.0	80.0	
190	7	B	P18A3	F	N		8.5	Y	+ 6	+ 6	6050	75	30.05	68						L	79.0	80.3	80.1	79.4	78.5	77.4
430	26	B	P18A3	F	N		8.5	Y	+ 6	+ 6	10305	83	29.87	130							83.0	84.0	84.0	83.0	82.5	82.0
431	26	B	P18A3	F	N		8.5	Y	+ 6	+ 6	10252	81	30.03	129						80.5	82.5	83.0	82.0	81.0	80.5	
175	41	C	215M4	C	N		9.4	N	+ 3	+ 3	12285	69	30.02	58		87.0	88.0	87.5	86.5	84.5	82.0					
34	29	C	220A3	F	N		8.5	Y	+ 5	+ 5	12486	70	30.21	60					89.5	90.0	90.0	89.5	88.5	87.0	85.0	
311	5	E	216A3	F	N		9.4	Y	+10	+10	6519	67	30.20	52				82.0	82.0	82.5	83.0	84.5	85.0	84.5	83.0	82.0
354	62	E	216A3	F	N		9.4	Y	+ 8	+ 8	16028	70	29.95	60						80.5	86.3	85.8	84.5	82.9	81.2	79.8
355	62	E	216A3	F	N		9.4	Y	+ 8	+ 8	16084	69	30.22	47						78.0	85.0	84.5	82.9	84.2	85.6	83.0
356	62	E	216M5	F	N		9.4	N	+15	+15	13823	74	30.09	60			88.6	88.5	88.2	87.9	87.5	87.0	86.2	85.5	84.8	83.9
143	28	E	P20A3	F	N		8.5	Y	0	0	10374	70	29.24	50	L	L	L	L	76.0	80.0	83.0	85.0	81.0	77.0	L	L
191	7	E	P20A3	F	N		8.5	Y	0	0	12093	70	30.71	52						84.3	87.0	88.7	88.0	86.9	85.8	84.6
210	28	E	P20A3	F	N		8.5	Y	0	0	9549	70	29.42	50					81.0	82.5	86.0	84.0	83.0	81.5	80.0	79.0
211	28	E	P20A3	F	N		8.5	Y	0	0	8903	70	29.41	50	L	L	L	L	84.0	86.0	84.0	82.0	80.5	79.0	77.0	L
357	62	E	P20M5	F	N		8.5	Y	+ 4	+ 4	6527	71	30.35	56					85.8	87.0	88.6	90.1	90.8	90.0	89.0	87.5
35	29	E	P30A4	F	N		9.0		+20	+20	9546	70	30.01	63					89.0	88.5	87.5	86.5	85.0			
358	62	E	P30A4	F	N		9.0	Y	+20	+20	23478	72	30.17	58			86.0	82.2	83.5	85.4	87.2	85.4	82.6	80.0	78.3	76.8
360	62	E	P30M5	F	N		9.0	Y	+23	+20	10846	70	30.45	53		85.0	89.6	87.5	85.5	83.6	82.0	80.2	78.8	77.5		
359	62	E	TP30A4	F	N		7.8	Y	+20	+20	8115	72	29.88	50							76.6	82.3	79.0	78.4	79.0	80.0
36	29	J	313M4	F	N		9.3	N	+21	+21	27607	70	30.21	60		H	H	H	H	H	H					
432	26	J	313M4	F	N		9.3	Y	+21	+21	10221	79	30.06	107			88.0	88.0	87.5	87.5	87.0	86.5	86.0	85.5	85.0	
433	26	J	313M4	F	N		9.3	Y	+21	+21	10165	77	29.93	99			89.0	87.5	86.5	86.0	86.0	85.5	85.0	84.5	84.0	

TABLE H-I - SPEED RANGE DATA

OBS NO	LAB NO	MODEL CODE	EMC T	EKSHE N	L	C.R.	A I R	SPK AS RCD	ADV AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
92	41	J 315A3	C	N	9.3	N	+15	+15	15221	72	30.02	63									85.5	87.0	86.5	85.0	
344	60	J 315M4	F	N	9.3	N	+22	+22	6152	70	30.18	51			88.0	88.2	87.5	86.8	85.9	85.2	84.8	84.1	83.8	83.3	
93	41	J 315M5	C	N	9.3	N	+20	+20	6228	75	30.12	58			82.5	83.0	84.0	84.5	85.0	85.0	85.0	84.5	84.0	83.0	
434	26	J 318A4	F	N	8.8	Y	+18	+18	17565	62	30.26	46	L	L	L	L	L	L	78.0	78.0	78.0	76.5	L	L	
164	47	J 318M5	C	N	8.8		+16	+18	7000	70	29.89	50	84.0	86.5	88.0	88.0	88.0	87.0	86.0	85.0	84.0	83.0	82.0	81.5	
131	28	N 210M5	F	N	9.5	Y	+10	+10	9744	70	29.21	50	L	94.5	93.5	91.5	90.0	88.5	87.0	85.5	85.0	84.0			
276	7	Q 216M4	F	N	9.0	N	+ 8	+ 8	7233	70	30.22	52		87.6	87.7	87.3	87.0	86.6	86.0	85.4	84.8	84.1	83.4	82.6	
345	60	T 215M5	F	N	9.0	Y	+ 5	+ 5	6270	68	30.49	50			92.0	91.5	90.1	88.8	87.5	86.3	85.0	84.1	83.2	82.5	
94	41	T 216A3	C	N	9.0	Y	+ 5	+ 5	20920	69	30.12	56					88.0	90.0	91.0	91.0	91.0	90.0	89.5	88.0	
346	60	T 216A3	F	N	9.0	Y	+ 5	+ 5	10126	70	30.22	60					85.5	87.8	89.5	89.0	88.1	87.3	86.3	85.2	
435	26	T 216A3	F	N	9.0	Y	+ 8	+ 5	18571	58	30.27	41							88.5	88.5	88.5	87.5	86.0	85.0	
67	8	T 216M5	A	N	9.0	Y	+ 5	+ 5	16387	73	29.95	40			86.0	90.5	91.0	90.0	89.0	87.5	86.0				
95	41	T 216M5	C	N	9.0	Y	+ 5	+ 5	28520	70	30.17	56		92.0	93.5	94.0	94.0	94.0	93.5	93.0	92.5	91.5	91.0	90.0	
165	47	T 216M5	C	N	9.0	N	+ 5	+ 5	8000	70	29.89	50			86.5	87.0	88.0	88.0	88.0	88.0	88.0	87.5	87.0	86.5	
347	60	T 216M5	F	N	9.0	Y	+15	+ 5	11792	69	30.55	50			87.0	89.4	89.9	89.3	87.5	85.8	84.8	83.8	83.0	82.4	
145	28	T P16M5	F	N	9.4	Y	+10	+10	10678	70	29.31	50	L	L	L	L	86.0	89.5	86.0	84.5	83.0	80.5	79.0	78.0	
66	8	T P20A3	A	N	8.7	Y	+ 5	+ 5	18468	80	29.30	64						86.5	85.0	83.5					
37	29	T P20A4	F	N	8.7	Y	+ 5	+ 5	9770	70	29.48	62					82.0	86.5	86.0	84.5	83.5	82.5			
166	47	T P20A4	C	N	8.7	Y	+ 5	+ 5	14500	70	30.03	50			84.0	86.5	87.5	87.5	87.5	86.5	85.0	83.5	83.0	82.0	
167	47	T P20A4	C	N	8.7	Y	+ 5	+ 5	10200	70	29.98	50			82.0	84.5	86.5	86.5	84.0	82.0	81.5	81.0	80.5	80.5	
348	60	T P20A4	F	N	8.7	Y	+ 5	+ 5	8263	68	30.24	64						82.0	85.0	85.7	85.1	84.3	83.3	82.0	
365	47	T P20A4	C	N	8.7	Y	+ 5	+ 5	6625	70	30.35	41		86.5	87.0	88.0	88.0	87.5	87.0	86.5	86.0	85.5	85.0	84.5	
366	47	T P20A4	C	N	8.7	Y	+ 5	+ 5	13375	70	30.25	44			86.5	88.0	88.0	87.0	86.0	85.5	85.5	85.0	85.0	84.5	
97	41	T P24A4	C	Y	L	9.0	Y	+ 5	+ 5	9475	68	29.94	55		76.0	76.5	77.0	77.0	77.0	77.0	76.5	76.5	76.5	76.0	76.0
349	60	T P28A4	F	N		9.2	Y	+12	+10	6072	72	30.48	58	84.0	85.3	84.5	83.4	82.5	81.7	81.0	80.2	79.5	78.9	78.3	77.8
350	60	T P28A4	F	N		9.2	Y	+10	+10	12313	71	30.02	60					83.0	86.5	84.6	83.2	82.0	80.7	79.6	78.8
260	41	T P28A4	C	Y	L	9.2	Y	+10	+10	11808	70	30.30	60		84.0	85.0	85.0	84.5	83.5	82.5	81.0				
312	5	V P23A3	F	N		9.5	Y	+12	+12	23764	69	29.78	89			86.0	86.5	87.0	87.5	90.0	89.0	88.0	87.5	87.0	87.0

TABLE H-I - SPEED RANGE DATA

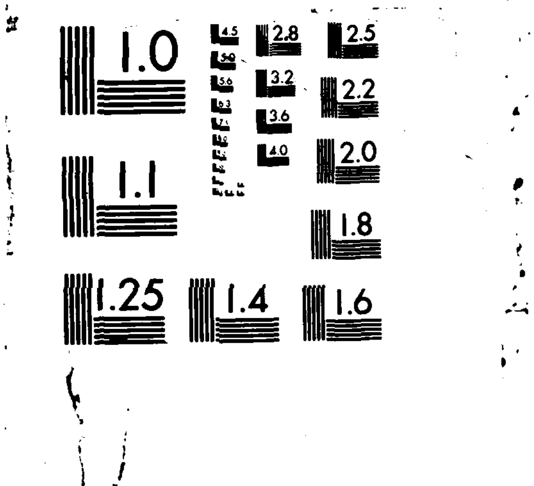
OBS NO	LAB NO	MODEL CODE	EMC T	EK SHE / N	L	C.R.	A I R	SPK ADV AS RCD	AS TST	ODOM MILES	AMB TMP	BAROM	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
168	47	[illegible]	220M5	C	N	8.6	Y	+ 8	+ 6	13600	70	29.98	50	85.0	86.5	87.0	86.5	85.0	84.0	83.0	82.0	81.0	79.5	77.5	76.0
170	47	CT	220M4	C	N	8.5	Y	+ 5	+ 5	7110	70	29.98	50		83.0	85.5	86.0	86.0	85.5	85.0	84.5	84.0	83.5	83.0	82.0
313	5	CT	220M4	F	N	8.5	N	+ 5	+ 5	6532	68	30.33	68				87.0	91.0	91.0	91.0	89.0	87.0	86.0	85.5	85.0
169	47	ET	224M5	C	N	8.5	Y	+ 1	+ 3	14400	70	30.05	50	88.0	89.0	89.0	89.0	88.0	87.5	86.5	85.0	84.0	83.5	83.0	82.0
171	47	TT	224M4	C	N	9.0	Y	0	0	8200	70	30.00	50	91.0	93.0	92.5	92.0	91.0	91.5	91.0	91.0	89.5	89.0	88.5	88.0

TABLE H-II

PRIMARY REFERENCE FUEL SPEED RANGE CALCULATED DATA - 1985 SELECT MODELS

Model Code		Engine rpm 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
DHD T22/KED T22/	Mean	-	88.5	89.5	85.2	86.4	87.5	86.8	86.2	86.0	86.1	84.8	85.3
KHD T22/KKD T22/	SD	-	-	-	6.0	3.3	3.4	4.0	4.0	4.5	4.5	4.5	3.7
PKD T22	N	-	1	1	4	8	9	10	10	8	6	6	3
ME4 216/OE4 216	Mean	-	93.0	92.1	90.8	90.7	89.9	88.7	88.6	87.8	87.1	86.7	84.9
	SD	-	-	1.8	1.4	1.3	1.3	1.9	1.2	1.6	1.7	2.1	-
	N	-	1	4	5	7	7	7	5	4	4	3	2
MTX T23/OTX T23	Mean	-	89.0	88.0	88.7	89.0	89.0	88.8	88.2	86.8	85.3	84.6	83.5
	SD	-	0.4	3.2	2.4	2.8	3.0	3.4	3.5	2.8	2.7	2.7	2.6
	N	-	4	9	11	11	12	11	10	9	7	7	6
HNL P30/INL P30	Mean	-	86.0	83.1	85.8	86.4	88.5	86.8	86.0	84.4	85.1	85.2	-
LNL P30	SD	-	-	4.6	5.2	3.6	3.1	2.8	3.7	3.9	1.6	-	-
	N	-	1	5	6	7	5	6	5	5	4	2	-
IA3 P38/IC3 P38	Mean	87.0	82.0	83.3	82.6	82.8	81.7	82.4	82.9	83.2	84.0	82.0	80.0
LA3/P38/LC3 P38	SD	-	-	1.6	2.8	4.1	4.6	3.1	3.4	4.0	-	-	-
	N	1	2	5	6	6	7	8	6	4	2	2	1
HGA 238/IGA 238	Mean	-	82.5	84.7	85.9	85.3	84.8	82.0	85.2	84.5	83.0	82.5	82.0
LGA 238	SD	-	-	3.3	4.0	3.9	3.8	4.3	-	-	-	-	-
	N	-	1	6	8	7	5	5	2	2	1	1	1
IBY 450/IGY 450	Mean	-	79.5	84.7	86.4	88.0	87.6	86.1	85.4	84.1	83.1	82.8	82.4
LBY 450/LGY 450	SD	-	3.6	3.4	3.6	3.2	3.1	3.0	3.4	3.7	3.6	3.0	-
	N	-	3	6	10	11	10	10	8	8	5	3	2
IJP T20/NJP T20	Mean	-	83.0	83.5	83.0	85.2	84.7	83.4	83.9	83.2	84.2	85.0	84.6
	SD	-	-	-	-	-	1.8	4.4	4.4	4.1	4.3	4.8	4.7
	N	-	1	1	2	2	4	6	7	9	6	5	5
GJW P28/HAW P28	Mean	-	80.6	80.6	81.1	82.6	82.7	82.7	82.4	82.3	82.4	82.6	83.9
LXW P28/NAW P28	SD	-	-	3.0	2.2	2.0	1.8	1.8	1.8	2.2	3.0	4.0	3.2
	N	-	2	5	9	10	11	11	13	14	13	12	10

SD = Standard Deviation; N = Number of Observations



ROCOPY RESOLUTION TEST CHART

END

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